MONTANA

Fish and Game Commission

COMPLETION REPORT

JOB III-B -- PREDATOR AND WILDLIFE DAMAGE SURVEYS

PROJECT W-49-R-9 -- FUR RESOURCES, PREDATOR AND BEAR SURVEYS AND INVESTIGATIONS

By - Robert L. Brown

Not for publication

Wildlife Restoration Division

Pittman-Robertson Federal Aid Projects
May 1, 1959 - April 30, 1960

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for

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WILDLIFE RESTORATION DIVISION

STATE OF MONTANA

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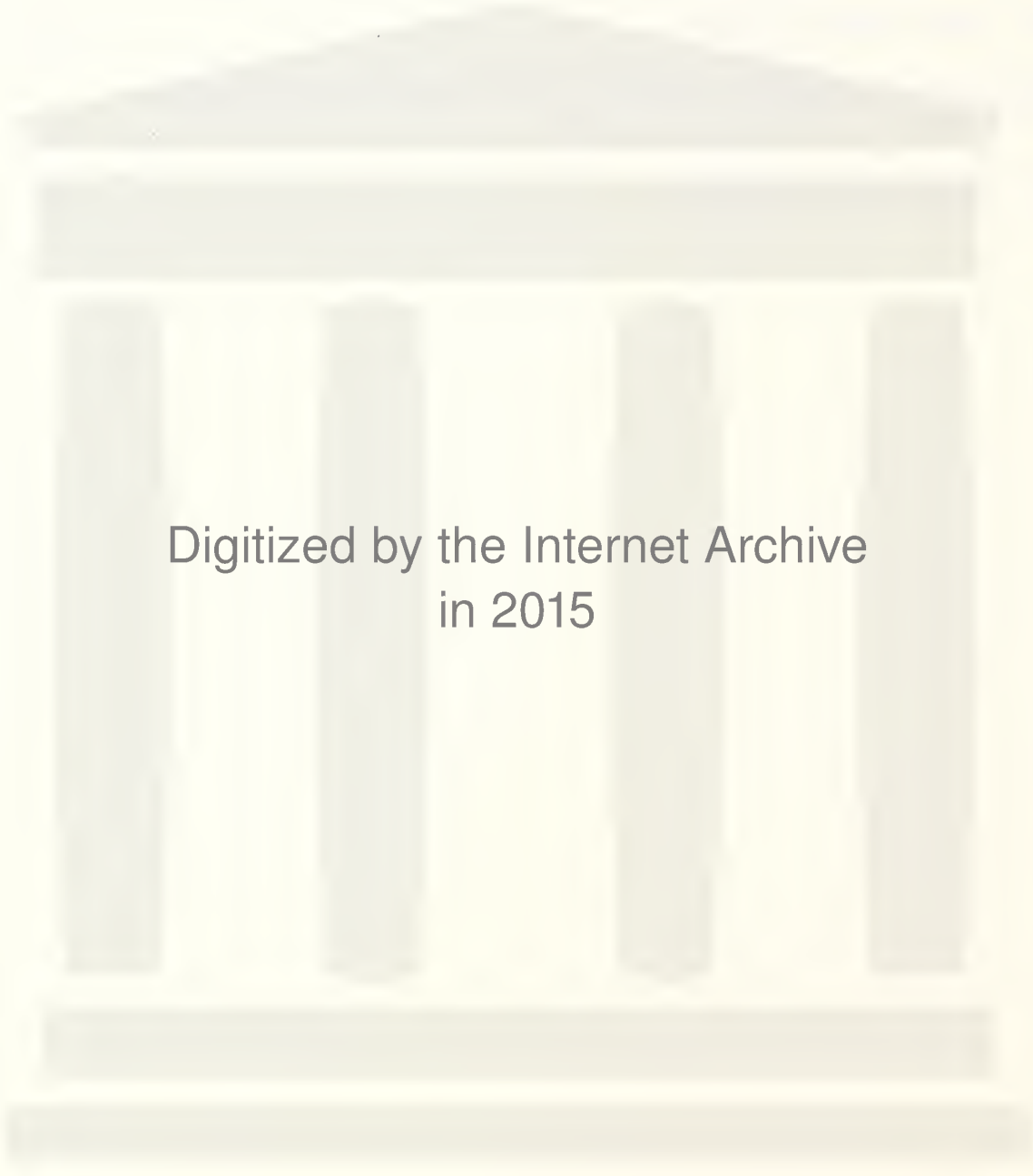

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JOB COMPLETION REPORT

INVESTIGATIONS PROJECT

State of Montana

Project No.: W-49-R-9 Name Fur Resources, Predator and Bear Investigations

Job No.: III B Title Predator and Wildlife Damage Surveys

Period Covered: May 1, 1959 through April 30, 1960

Summary:

The incidence, distribution and extent of agricultural losses to predatory animals and other classes of wildlife during 1957 were determined through a statewide mail survey. Personal interview surveys conducted in two check areas made it possible to evaluate the representative nature of the mail survey. Information from the mail survey was based upon a 22 percent sample of the total ranch and farm units in the state. This sample resulted from a 74 percent response from one mailing of 10,087 questionnaires which were followed in ten days by a postcard reminder. The use of a representative mailing list was made available by the U. S. Department of Agriculture Marketing Service.

Twenty-one percent of the total respondents having livestock and/or poultry reported some loss to predatory animals. Losses to predators are discussed in relation to the following: predator species reported responsible, distribution by administrative districts, deaths from other causes, total livestock populations, economic value, control measures involved, and reporting bias determined from the personal interview survey. Both reporting and sampling biases appear responsible for somewhat inflated livestock loss figures in the mail survey. On the other hand, poultry losses appear biased negatively because of a lack of reporting detail which resulted from minor poultry losses not being reported. Predator depredations on livestock and poultry in Montana during 1957 amounted to a loss of between $388,000 and $774,000. Sixty-seven percent of the dollar loss involved sheep, of which the higher figure represents 2.4 percent of the total value of farm sheep production for the year.

Twenty percent of the respondents reported damage from fur animals which was evaluated as heavy in one case out of four. Beaver were listed responsible in 83 percent of the total damage reports which mainly involved tree cutting, land flooding and damage to irrigation structures. Crops, stored feed or other property losses to big game animals were listed by 31 percent of the ranchers and farmers reporting. Deer and antelope were named responsible in 93 percent of the total reports which were generally concerned with losses of grain, alfalfa, and hay. Only 18 percent of the damage from big game animals was considered heavy. Crop damage from game birds was reported by six percent of the mail survey respondents. Pheasants and ducks, respectively, were listed responsible for 65 and 24 percent of the total

losses which involved grain in eight out of ten reports. Little concern was indicated by farmers reporting crop losses from game birds for only 13 percent of the damage was evaluated as heavy.

Eight million acres of owned and leased land were closed to public hunting according to expanded mail survey data. This involves 12 percent of the total owned and leased acreage and 9 percent of the total farm units in the state.

From the information obtained from the personal interview check areas, no significant difference was found between the mail and personal interview data concerning the frequency of occurrence or incidence of big game and game bird damage. The difference in the incidence of fur animal damage was found significant at the 95 percent confidence level. The difference in the occurrence of reported predator depredations from the two surveys was highly significant, (above the 99 percent confidence level). Evidence was presented which indicated that minor poultry losses were not commonly reported in the mail survey, thus a negative bias was introduced in the reported incidence of predator depredations and in the reported number of poultry lost. The representative nature of mail survey respondents was generally supported by livestock data from the U.S.D.A. Marketing Service and U. S. Bureau of the Census as well as by agricultural information from the personal interview survey. The larger livestock operations do, however, appear to be somewhat more than adequately represented according to the livestock data.

Objectives:

To determine the type, distribution and extent of agricultural losses to predatory animals and other wildlife conflicts with agriculture.

Procedure:

Mail Survey

The mail survey method was employed for obtaining information concerning wildlife conflicts with agriculture on a statewide basis. The scope of the survey was modified and the design of the mail questionnaire (Figure A-1) was improved through information obtained in a personal interview survey pilot study which was conducted by David Lane during the summer of 1957 (Brown, 1958). Invaluable assistance in designing the questionnaire was given by Mr. P. J. Creer and Mr. R. D. Rawson, of the U.S.D.A. Agricultural Marketing Service; members of the Wildlife Restoration Division; and Dr. A. D. Samson, of Montana State College. Joint sponsorship with the State Department of Agriculture, which is indicated on the questionnaire, was designed to minimize bias from the originating agency. Questions on the farm operation and livestock numbers were included to enable an analysis of the representative nature of the survey respondents. The predator and fur animal questions were placed toward the middle of the questionnaire in order to minimize interest and nonresponse bias from operators who had not experienced problems with animals in these categories.

The use of an active, representative mailing list was obtained through the cooperation of the State Department of Agriculture and the U. S. Department of Agriculture Marketing Service. The cooperation of Mr. Kruse, Commissioner of Agriculture, and Mr. Smith and Mr. Creer of the U.S.D.A.

Marketing Service made the use of this mailing list possible. Thirty percent of the ranch and farm operators in the state were included in the initial mailing of 10,125 survey forms on March 24, 1958.

Following a procedure used by Mr. Creer of the Agricultural Marketing Service, a post card reminder (Figure A-2) was sent to nonrespondents ten days after the initial mailing of the questionnaires. Although advance publicity was given the survey in livestock magazine articles and news releases, no other means was employed to increase response.

Personal Interview Survey

In order to evaluate possible sampling and nonresponse bias a personal interview survey completely independent of the mail survey was conducted on a systematic random sample of farm operators in two counties during the summer of 1958. Random area sampling described by Schultz (1954: 449) was employed at the 20 percent level in selecting sample units for this check survey. This procedure involves the use of county highway maps on which five farm units are grouped into cells, each unit numbered in a counter clockwise manner, and one unit selected from each cell from a table of random numbers. One to four year old revisions of state highway maps were used in the survey.

U. S. Bureau of the Census criteria were used to determine the status of small farms (1956: XII). To be included in the survey small farms of over three acres must produce agricultural products equal to at least $150 in annual value. Farms of three acres or less must have an annual sale of agricultural products equal to at least $150. Farms within city limits or in areas of urban development were excluded from the population sample because they were not considered typical with reference to wildlife problems.

Additional active farm units observed were plotted on maps and included into cells, or inactive units were deleted. In such cases, the remaining units in the cell were renumbered and the random number sampling procedure was repeated. The number of additions, deletions and substitutions are shown in Table 1.

TABLE 1

ADDITIONS, DELETIONS, AND SUBSTITUTIONS FROM RANDOM AREA SAMPLING IN PERSONAL INTERVIEW SURVEY

County	Completed Interviews	Additional Units Observed	Units No Longer In Cell	Alternate Units Selected
Richland	204	16	40	48
Valley	208	6	32	48

A two page form of similar content as the mail questionnaire was used by interviewers in the check survey. Interview durations were generally 15 minutes. With much of the area sparsely populated, from 7 to 18 interviews were completed by each interviewer daily. Forty-two man days including travel time to and from the areas were required for the survey. This included 412 completed interviews of farm and ranch operators in Richland and Valley Counties.

Data Processing Procedures

Similar editing, coding and IBM procedures were used in compiling both mail and personal interview survey data. Code sheets and IBM listings were organized and designed through the assistance of Mrs. Fitzgerald, Department IBM Supervisor. Completed questionnaires were edited and coded at the rate of 300-400 per day. The coded information from each questionnaire was punched on two IBM cards by two operators. The first operator entered the information from question one through five on the first card, and the second operator duplicated the farm operation data (question 1-3) from the first card and entered the remaining information from question six through twelve on the second card. Following a random verification of some 300 IBM cards, errors were found in relation to displaced columns. These errors were corrected through a complete check of the cards. Other key punching and coding errors were found to be insignificant. Processing errors were minimized by standardizing procedures and using a minimum of personnel.

Response and Representative Nature of Respondents

A single mailing of the questionnaire followed ten days later by a post card reminder to nonrespondents resulted in a useable return of 74 percent, or 7,488 of the 10,125 survey forms. Thirty-eight questionnaires were unclaimed and 58 were returned in unuseable condition (Table A-1). Consequently 22.6 percent of the 33,061 farm and ranch units in the state (Anon., 1956) are represented in the mail survey.

Questions on the farming or ranching operation were included on both mail and personal interview questionnaires so that the representative nature of the survey respondents could be evaluated. Two methods are employed in the following evaluation. One involves the comparison of expanded livestock statistics from the mail survey with those of the U.S.D.A. Agricultural Marketing Service, and the other deals with a comparison of livestock statistics and types of agricultural operations reported by farmers and ranchers in the mail and personal interview surveys.

The livestock and poultry inventory question on the mail survey form was designed to obtain information comparable with meat animal inventory statistics from the U.S.D.A. Agricultural Marketing Service. A similar, though somewhat larger segment of the agricultural population was sampled in our mail survey; therefore, if major differences between inventory numbers occurred they would be expected to show the effects of an interest bias resulting from a survey dealing primarily with the subject of wildlife problems. Unfortunately, nearly three months separate the inventory date from the reporting date of the wildlife damage survey. As a result, there is a possibility that memory bias may also effect the accuracy of the inventory figures. Effects of this type of bias are discussed further in the section dealing with predator losses. Livestock and poultry

inventory data from the mail survey and from Agricultural Marketing Service Reports are listed in Table A-2 and a general comparison is made in Table A-3. The method of gross expansion of mail survey inventory data may also account for some of the differences between the inventory figures. Cattle, sheep and especially turkey raising operations appear more than adequately represented, however, the reverse seems to be the case with hog and chicken operations. An evaluation of interest bias in the mail survey is complicated by other types of response bias and by the lack of stratified expansions of livestock inventory data. Since turkey and sheep losses to predators were the highest in relation to total poultry and livestock populations, the difference in reported inventory numbers of 30.5 percent for sheep and 116.7 percent for turkeys may reflect a certain amount of interest bias. A further comparison of agricultural statistics concerning the number of farms having cattle and sheep with information from the mail survey (Table A-5) shows respondents with cattle and sheep closely represent the statewide agricultural population. Based upon 1954 census figures, (Anon., 1956) the latest statistics available, 80.8 percent of the farms in the state carried cattle and 14.9 percent carried sheep. In comparison, 76.6 percent of the mail survey respondents reported cattle and 16.1 percent reported sheep. Farm census figures concerning livestock for 1954 should be applicable for 1957 because livestock inventory figures are similar for the respective years. Information on average livestock numbers indicates the responding segment of the mail survey sample may be biased somewhat in favor of the larger livestock operations.

The representative nature of the active mailing list used in the survey is supported by information concerning livestock which was obtained in the personal interview check survey. Livestock statistics from the mail survey, the personal interview survey, the U.S.D.A. Marketing Service, and the U. S. Bureau of the Census for the two counties used as check areas are presented in Table A-6. Close agreement between the more important livestock classes of cattle and sheep is indicated with the exception of sheep in Richland County. The inclusion of feeder sheep in mail and personal interview survey figures from Richland County, an important sheep feeding area, brings the total sheep numbers well above the stock, sheep and lamb figures from the Agricultural Marketing Service. A lack of reporting detail is indicated in the mail survey by the consistent representation of lower numbers of farms with livestock and poultry of minor economic importance. It is most pronounced in the case of horses which according to personal interview survey figures were on 438 and 470 farms, respectively, in Richland and Valley Counties, but according to mail survey figures were on only 42 and 83 of the farms in the respective counties.

Although livestock numbers from the personal interview survey are not directly comparable with the inventory figures from the mail survey or U.S.D.A. Marketing Service because they represent the total livestock on the farm during the year, they are nearly equal to the sum of inventory and production figures; therefore, personal interview inventory figures under "cattle" and "sheep" approximate inventories, and those under "calves" and "lambs" closely equal annual production. In general, the representative nature of the

mail survey is supported by the livestock statistics from the personal interview survey and federal reports. Major livestock operations appear proportionately represented by the mail survey respondents. Minor livestock operations lacked reporting detail in the mail survey, therefore the representative characteristics of the respondents in this regard cannot be demonstrated. The livestock data concerning average numbers per farm unit suggest that larger than average farm units are represented in the mail survey.

The representative nature of the mail survey sample is supported by the similarity of agricultural types indicated in the mail and personal interview survey comparison presented in Table A-4. Although primary farming or ranching operations were requested in the mail questionnaire, as many as three or four types were marked by some respondents. All entries of three or more types were placed in the "general farming" category consequently, this method of grouping may be responsible for some of the differences noted in the agriculture types of less importance. Primary and secondary farming types reported in the personal interview survey were included in calculations for the table. Major agricultural operations were cash crop, grain, range livestock, and feeder livestock in Richland County and grain and range livestock in Valley County. The frequency of these agricultural types reported from both surveys agree within 11 percent. Using a graphic method of testing for significant difference between the groups at the 95 percent confidence level, there was no difference indicated between the agricultural types reported in the two surveys except for the general farming category in Richland County and the cash crop category in Valley County. With these minor exceptions the representative nature of the mailing list and the responding mail survey sample is supported by the data concerning agricultural types obtained through the personal interview check survey.

Predator Depredations

Incidence of Losses

Predator depredations were reported to have occurred on 1,332 farms and ranches during 1957 which comprised 20.7 percent of the total agricultural units in the state with livestock and/or poultry. This figure is slightly less than the 22 percent incidence of predator losses reported by Michigan farmers in 1955 according to Schofield (1957:3). The sampling level, distribution of farm units with livestock and/or poultry, and incidence of reported predator losses in relation to administrative districts are shown in Table 2. The responding sample stratified according to administrative districts (Figure 1) ranged from a low of 17.4 percent in District One (northwest) to 25.3 percent in District Four (north central). The expansions of livestock and poultry losses to predators were based upon information from these samples, with the exception of calf losses to bear. In this case, because of the unusually high losses of calves reported from the small sample of farm units in District One (northwest), a more realistic loss was obtained through an expansion on a statewide basis. The greatest percentage of farm units reporting livestock or poultry losses to predators was in District Three (south central) where stock ranching and diversified farming are major agricultural operations. The lowest incidence of predator depredations was reported from District One in the northwestern section of the State where lumbering and diversified farming are major forms of land use.

TABLE 2

SAMPLING LEVEL AND INCIDENCE OF LIVESTOCK AND POULTRY LOSSES BY ADMINISTRATIVE DISTRICTS

District	Farm Units In District [1]	Farm Units In Sample [2]	Percent In Sample	Conversion Factor	Units With Livestock and/or Poultry		Units With Predator Losses	
					Number	Percent	Number	Percent of Total [3]
One (Northwest)	3902	680	17.43	5.74	599	88.1	95	15.9
Two (Southwest)	2643	462	17.48	5.72	432	93.5	72	16.7
Three (South Central)	3437	736	21.41	4.67	696	94.5	175	25.1
Four (North Central)	6914	1752	25.34	3.95	1429	81.5	257	18.0
Five (Central)	4412	903	20.47	4.88	860	95.2	207	24.1
Six (Northeast)	7827	1945	24.85	4.02	1489	76.6	318	21.4
Seven (Southeast)	3926	984	25.06	3.99	925	94.0	206	22.3
TOTAL	33061	7462	22.52	4.44	6430	86.2	1332	20.7

1 1954 Federal Census figures
2 Farm units with information on the predator question
3 Percent of total units with livestock and/or poultry

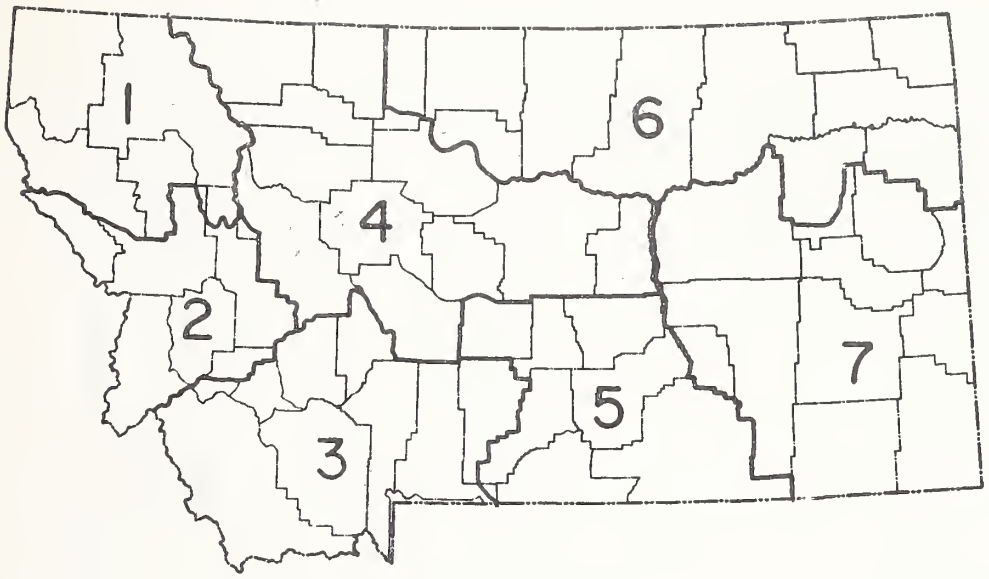


Figure 1. Administrative Districts

Livestock Losses In Relation to Predator Species Responsible

The reported numbers of livestock lost by classes in relation to predator species named responsible are presented in Table 3. The vulnerability of sheep to predators, especially to coyotes, is readily apparent from the tabular data. Ninety-five percent of the total livestock losses involved sheep and lambs, nearly half of which was reported due to coyotes. Because of the tendency for many respondents to lump their losses as "sheep", the total numbers given in the age classes are biased in favor of the older age group. The proportion of age classes reported lost varied greatly according to the predators named responsible. For example, eagles were named responsible for losses of 29 sheep and 802 lambs; bear, for 1,121 sheep and 88 lambs; and bobcats, for 135 sheep and 384 lambs. The numbers in the age classes lost to eagles and bobcats appear reasonable in view of the eagle's limited capability of taking large prey such as adult sheep and the normal tendency of a carnivore such as the bobcat to capture the most vulnerable class of prey. In the case of sheep losses to bear, the age groups reported appear to be shrouded by a lack of reporting detail as well as inflated by carrion feeding activities mistaken for depredations. Predators named responsible for sheep losses in order of importance were coyote, bear, eagle, bobcat, dog, badger and fox. Swine losses were mainly attributed to dogs and to a lesser extent to bear, bobcats and foxes. Carrion feeding activities of bear mistaken by stockmen for livestock predation are undoubtedly represented in the table and are not necessarily restricted to sheep. The extent of this bias concerning cattle is indicated by the results of 49 cases of reported bear depredations which were investigated by game department wardens during 1958. Only four of these cases involved cattle, and only one concerning a calf was verified as a bear kill (Brown, 1959:22). Cattle and calf losses amounted to four percent of the total livestock reported taken by predators. Bears and dogs were the culprits named in 88 percent

TABLE 3

REPORTED NUMBER OF LIVESTOCK LOST BY CLASSES
IN RELATION TO PREDATOR SPECIES
STATEWIDE

Predator Responsible	Livestock Reported Lost to Predators: Cattle No.	Cattle %	Calves No.	Calves %	Sheep No.	Sheep %	Lambs No.	Lambs %	Swine No.	Swine %	Total No.	Total %
Coyote	1	1.7	31	16.6	1596	47.5	1158	45.0			2786	44.4
Bear	39	67.2	66	35.3	1121	33.3	88	3.4	26	26.3	1340	21.3
Eagle			6	3.2	29	0.9	802	31.2			837	13.3
Dog	12	20.7	57	30.5	479	14.2	52	2.0	41	41.4	641	10.2
Bobcat			14	7.5	135	4.0	384	14.9	16	16.2	549	8.7
Badger							35	1.4			35	0.6
Fox							25	1.0	16	16.2	41	0.6
Magpie	3	5.2									3	0.04
Mtn. Lion			2	1.1	1	0.0					3	0.04
Unk. Pred.	3	5.2	11	5.9	2	0.1	29	1.1			45	0.7
TOTAL	58	100.0	187	100.1	3363	100.0	2573	100.0	99	100.1	6280	99.8
PERCENT OF TOTAL		0.9		3.0		53.6		41.0		1.6		100.1

of the cattle deaths, and bears, coyotes and dogs were listed responsible for 82 percent of the calf losses.

Representing the only bountied predator in the State, the mountain lion ranks at the bottom of the list as a livestock predator. Expanded losses to lions amounted to 11 calves and 4 sheep in the southwestern and north central areas of the State.

Poultry losses reported in relation to predator species responsible are shown in Table 4. Chickens comprise 90 percent of the total losses; turkeys, 5 percent; and ducks, geese, and guinea fowl the remaining 5 percent. Skunk and bobcat are listed as major poultry predators, together responsible for 57 percent of the total poultry losses. The skunk is indicated as the major predator on chickens and ducks, while the bobcat is shown as the most important on turkeys and geese. Dogs represent the third most destructive predator on poultry. Raccoons and foxes listed fourth and fifth, respectively, as poultry predators have been increasing in numbers and extending their range in eastern Montana in recent years. Of the total poultry lost to raccoons, 70 percent was reported from District Seven in the southeastern section of the State. Sixty-seven percent of the total poultry lost to foxes was reported from District Six in the northeastern portion of the State where the greatest increase in red fox numbers has occurred.

Distribution of Losses

Distributional data concerning expanded numbers of livestock and poultry by classes which were reported lost to predator species in administrative districts are presented in three ways in the following tables to facilitate detailed comparison. Stratified expansions of livestock and poultry losses according to administrative districts are shown in Table A-7. Expanded numbers of livestock and poultry lost to predator species by administrative districts are listed in Tables A-8 through A-14. Expanded numbers of livestock and poultry lost by administrative districts in relation to predator species responsible are given in Table A-15.

From Table A-7 it is apparent that more cattle were lost to predators in District Three (south central) than in any other district. Detailed information regarding District Three is given in Table A-10 where bear are listed responsible for 103 of the 117 cattle losses; dogs, for 9; and magpies for the remaining 5. By referring to Table A-15 the predators allegedly responsible for the statewide cattle losses are shown to be bear in Districts One, Three and Four; dogs, in all but District Two; and magpies, in Districts Two, Three and Six. The unusually high calf loss reported in District One (northwest) is shown to be caused mainly by bear and dogs and to a minor extent by coyotes (Table A-8). The greatest number of sheep lost to predators is shown to be from the north central section of the State, or District Four. According to Table A-11 of the 7,500 sheep and lambs killed by predators in this area during 1957, 2,900 were by bears, 2,620 by coyotes, 1,320 by eagles, 200 by dogs, and 120 by badgers. Swine losses throughout the State were incidental compared to depredations on other

TABLE 4

REPORTED NUMBERS OF POULTRY LOST BY CLASSES
IN RELATION TO PREDATOR SPECIES
STATEWIDE

Predator Responsible	Poultry Reported Lost to Predators: Chickens No.	%	Turkeys No.	%	Ducks No.	%	Geese No.	%	Guineas No.	%	Total No.	%
Skunk	6566	39.7	172	18.9	138	25.7	48	12.6			6924	37.6
Bobcat	2827	17.1	337	37.0	120	22.3	189	49.6	18	37.5	3491	19.0
Dog	1288	7.8	29	3.2	66	12.3	16	4.2			1399	7.6
Raccoon	1108	6.7	58	6.4			15	3.9	8	16.7	1189	6.5
Fox	916	5.6	66	7.2	85	15.8	19	5.0	4	8.3	1090	5.9
Coyote	780	4.7	113	12.4	37	6.9	17	4.5			947	5.1
Badger	768	4.6	34	3.7	14	2.6					816	4.4
Mink	705	4.3			46	8.6	52	13.6			803	4.4
Weasel	394	2.4			5	0.9					399	2.2
Hawk	318	1.9	47	5.2	9	1.7					374	2.0
Magpie	263	1.6									263	1.4
Unk. Predator	173	1.0	22	2.4	15	2.8	21	5.5			231	1.3
House Cat	217	1.3	12	1.3							229	1.2
Owl	156	0.9	6	0.7	1	0.2	4	1.0	18	37.5	185	1.0
Eagle	37	0.2	15	1.6							52	0.3
Bear			10								10	
TOTAL	16536	99.8	921	100.0	536	99.8	381	99.9	48	100.0	18402	99.9
PERCENT OF TOTAL		89.8		5.0		2.9		2.1		0.3		100.1

classes of livestock. Highest swine losses occurred in District One (Table A-7) where bear were indicated solely responsible. The greatest loss of poultry over the state was reported from the northeastern section, or District Six. In this area the major predators named responsible in order of importance were: skunk, fox, bobcat, dog, mink and coyote (Table A-13). The extension predator program aimed at controlling losses from the smaller predators was initiated in this section of the state in 1958. The lowest loss of poultry was reported from District Two (southwest) where skunks, coyotes and dogs were listed as predators of major importance.

The greatest loss of livestock and poultry to each predator species by administrative districts is shown in Table A-15. The greatest loss to skunks was in District Six (northeast); to bobcats, in District Five (central); to coyotes, in District Three (south central); to dogs, in District Five; to bears, in District Four (north central); to raccoons, in District Seven (southeast); to foxes, in District Six; to eagles, in District Four; to badgers, in District Six; and to mink, also in District Six. Although the general distribution and abundance of each predator species may be indicated by the tabular data concerning livestock and poultry losses, the influence of variations in agricultural types, livestock numbers and rural population levels between administrative districts must be considered for accurate interpretation.

Losses in Relation to Total Populations and Deaths From All Causes

The extent of livestock and poultry losses to predators in relation to total populations and deaths from all causes is indicated in Table 5. Livestock population and death rate figures are from U. S. Department of Agriculture Marketing Service Reports. Annual losses from disease, poisonous plants, accidents and predation are included under the heading, "deaths from all causes." Dr. Safford, State Veterinarian for Montana, estimated that from 60 to 75 percent of the total livestock deaths result from disease alone. He further pointed out that the disease losses indicated do not include those from abortions or still births. Also excluded from these figures are lamb losses which occurred prior to docking. This is normally the period of highest death rate, therefore, a negative bias definitely exists in the data presented under the heading, "deaths from all causes." Expansions of livestock and poultry numbers reported lost to predators in the mail survey are listed under the heading "predator losses." They are shown as the percentage of total populations lost to predators and the percentage of all deaths caused by predators.

The lowest livestock loss to predators compared with deaths due to all causes occurred in the cattle class; the highest in the sheep class. Sheep are obviously the most vulnerable class of livestock to predation, however, only 11 sheep are shown to be lost to predators for every 89 lost through disease, plant poisoning, or accident. Predator losses in relation to total livestock and poultry populations varied from a low for cattle of one per 10,000, to a high for turkeys of six and one-half per 100.

TABLE 5
LIVESTOCK AND POULTRY LOSSES FROM PREDATORS IN RELATION TO DEATHS FROM ALL CAUSES AND TOTAL POPULATIONS DURING 1957

Class of Livestock	Population[1]	Total Deaths From All Causes		Total Predator Losses[3]	Percent of All Deaths from Predators	Percent of Total Pop. Lost to Predators Only
		Number[2]	Percent of Total Population			
Cattle	2,317,000	26,000	1.1	261	1.0	0.01
Calves	1,102,000	55,000	5.0	870	1.6	0.08
Cattle & Calves	3,419,000	81,000	2.4	1,131	1.4	0.03
Sheep	1,542,000	122,000	7.9	14,791	12.1	0.96
Lambs	1,123,000	116,000	10.3	11,104	9.6	0.99
Sheep & Lambs	2,665,000	238,000	8.9	25,895	10.9	0.97
Swine	301,000	18,000	6.0	463	2.6	0.15
Chickens	4,268,000			71,388		1.67
Turkeys	60,000			3,929		6.55

1 From U.S.D.A. Marketing Service Inventory and Production Statistics
2 From U.S.D.A. Marketing Service
3 Calculated Number From Mail Survey

TABLE 6

PERCENTAGE COMPARISON OF CONTROL MEASURES EMPLOYED BY FARMERS AND RANCHERS WITH LIVESTOCK AND POULTRY LOSSES TO PREDATORS

Type of Loss	Total Farm Units	Percentage Frequency of Occurrence of Control Measures							
		None	Shooting	Trapping	Government Hunter	Poison	Game Warden	Repellents	No Answer
Cattle & Calves	122	28%	38%	23%	27%	15%	10%	2%	7%
Sheep & Lambs	355	15%	36%	32%	60%	32%	5%	1%	4%
Chickens	769	22%	54%	33%	6%	6%	3%		5%

The percentage of the total chicken population lost to predators was half that found in Michigan during 1955 by Schofield (1957:3). The percentage of the total sheep population reported lost to predators from this survey was twice that reported in Michigan (Ibid) and three times as great as the predator depredations found in Utah from a study of sheep losses on a summer range (Rosko, 1948:6). Rosko checked sheep herds at regular intervals on a 250 square mile area throughout the summer grazing season of 1947 and found that losses to predators amount to 0.29 percent of the total sheep population. Losses from other causes were nearly three times as great. Through interviewing sheep owners after the grazing season he also found the reported losses to predators about twice as high as his observed figures. The extent predators were unjustly blamed for livestock and poultry losses by respondents in this survey is not known, however, a reporting error which would also tend to inflate the livestock and poultry loss figures was noted during the course of the personal interview check survey. This involves the tendency for some farmers to include losses which occurred before or after 1957 in their replies. It was especially evident where large losses were involved or when losses had occurred shortly before the survey. In evaluating the extent of livestock losses determined from the survey, all evidence indicates the figures are somewhat inflated. The representation of larger than average farm or ranch units in the responding sample, the slight overrepresentation of farm units with sheep, the inclusion of losses from other causes than predation or of predator losses from other years all appear to contribute to a positive bias of unknown magnitude. In contrast, poultry loss figures from the mail survey appear negatively biased. This is based on the findings of the personal interview check survey which indicate minor poultry losses experienced by farmers in the check areas often were not listed on their mail survey forms because the loss of one or two chickens or a duck either was not immediately recalled or was not considered of enough importance to report. Factors indicating this bias are discussed further in the section dealing with the personal interview check survey.

Economic Losses

During 1957 the total economic loss of livestock and poultry to predators in the State amounted to between $774,000 and $388,000. These figures shown in Table 7 are based upon the calculated losses from the mail survey, the average market value per head between 1957 and 1958 from the Agricultural Marketing Service, and an adjusted value which is equal to half the market value. The total loss of $388,000 based upon the adjusted value is considered the most representative figure for two reasons; first, the major loss of a given kind of stock to predators is among the young age class not of marketable age or value, and second, the calculated livestock loss figure from the mail survey is undoubtedly inflated because of the reporting bias discussed previously. The unadjusted figure, on the other hand, may more closely equal the loss of potential income from calves, lambs, or chicks killed by predators. The latter evaluation is quite liberal in that, among other reasons, no loss from other causes is assumed to occur before marketing.

TABLE 7

CALCULATED ECONOMIC LOSS OF LIVESTOCK AND
POULTRY TO PREDATORS DURING 1957

Class of Stock	Number Calculated Lost in 1957	Value Per Head [1]	Total Loss	Adjusted Value Per Head [2]	Total Loss Number	Total Loss Percent
Cattle & Calves	1,131	$109.00	$123,279	$54.50	$ 61,640	15.9
Sheep & Lambs	25,895	19.95	516,605	9.98	258,432	66.7
Hogs	463	26.45	12,246	13.23	6,125	1.6
Chickens	71,388	1.25	89,235	.63	44,974	11.6
Turkeys	3,929	5.90	23,181	2.95	11,591	3.0
Ducks	2,625	1.50*	3,937	.75	1,969	0.5
Geese	1,753	3.00*	5,259	1.50	2,629	0.7
Guineas	494	1.00*	494	.50	257	0.0
			$774,236		$387,617	

1 Average Market Value
From U.S.D.A.
Marketing Service
Jan. 1, 1957 - Jan. 1, 1958

2 Approximated value considering major loss of a given class of stock to predators is young age class not of marketable age.

* Estimated value

Sheep owners experienced the greatest dollar loss to predators as the value of sheep reportedly lost through predator depredations equalled 67 percent of the total economic loss from predatory animals during the year. Using the liberal $516,600 figure for sheep losses to predators from the survey, and the sheep, lamb and wool production values of $21,932,000 for 1957 from the Agricultural Marketing Service (Creer, et al, 1958:26), the economic loss of sheep to predators during 1957 amounted to 2.4 percent of the total farm sheep production. Cattle owners reportedly experienced 16 percent of the total economic loss to predators and farmers or ranchers with chickens, 12 percent. The remaining five percent of the total economic loss to predators was experienced by owners of hogs, turkeys and other classes of poultry.

Control Measures

Information concerning the control measures used by farmers and ranchers to stop their cattle, sheep and chicken losses to predators is presented in Table 6. More than one type of control measure may have been taken and consequently reported by a given farm operator, however, combinations of control measures employed are too numerous to be indicated in the table. Consequently, the frequency of occurrence of each measure is indicated in relation to the number of farm units losing a given class of livestock to predators. Shooting and trapping were most frequently used by landowners sustaining losses of cattle and chickens. Government hunters working under the Cooperative Predator Control Program, who usually employ trapping or poisoning as a control measure, were most frequently involved in the cases concerning the loss of sheep. Only six percent of the total landowners losing chickens to predators employed the services of the government hunters. This definitely shows the need for a supplemental program such as the extension approach which emphasizes damage control through landowner instruction in trapping methods. As mentioned earlier, such an extension program was initiated in the northeastern section of the State in 1958.

Effectiveness of Control Measures

Unfortunately, the question concerning the effectiveness of control measures in stopping losses from predators returned only a small quantity of data. There is little doubt that this question which covered all phases of wildlife damage was too all inclusive. Moreover, its placement near the end of the questionnaire resulted in a lack of completion. Nearly half the respondents with predator losses omitted the question or its pertinent section. As discussed previously, more than one control measure was usually indicated by respondents completing the question. This further complicates an evaluation of control measure effectiveness.

According to the reported data presented in Table 8, each of the control measures employed appear equally effective in stopping predator depredations for half the respondents involved. The percentage of cases in which losses stopped and in which losses continued for each control measure was found to fall within the 95 percent confidence interval for an assumed mean of $x/n = .5$ (Snedecor, 1946:5).

TABLE 8

EFFECTIVENESS OF CONTROL MEASURES EMPLOYED FOLLOWING THE OCCURRENCE OF PREDATOR DEPREDATIONS

Control Measure	Reports Concerning Control Measure Effectiveness: Depredations Continued Number	Depredations Continued Percent	Depredations Stopped Number	Depredations Stopped Percent	Total Number
Shooting	216	47.5	239	52.5	455
Trapping	149	52.3	136	47.7	285
Govt. Hunter	120	53.1	106	46.9	226
Poison	78	56.5	60	43.5	138
None	14	41.2	20	58.8	34
Grand Total	577	50.7	561	49.3	1138

The frequency of occurrence of multiple entries involving only trapping and government hunters which were employed as control measures is shown in Table 9. Trapping was included among the control measures employed by 285 respondents according to Table 8. In addition, 92 of these respondents also reported using the services of government hunters (Table 9). Although depredations reportedly continued in 43 percent of the cases in which both control measures were used, the difference was not significant from the 50 percent effectiveness indicated for the cases in which the two control measures were applied separately. A graphic method of testing for a significant difference between the groups at the 95 percent confidence level was used in the analysis. The evaluation of control measure effectiveness which is based upon the frequency of occurrence of a given control measure is open to question. If the data concerning the effectiveness of control measures were subject to fewer variables, an analysis based upon combinations of reported control measures appears the most appropriate. Under the circumstances, the data from slightly over half of the respondents reporting losses to predators simply indicate that half the respondents completing the question concerning control measure effectiveness did not experience a continuation of predator depredations no matter which control measure was reportedly taken.

TABLE 9

REPORTED EFFECTIVENESS OF TRAPPING AND/OR GOVERNMENT HUNTERS IN STOPPING PREDATOR LOSSES

Status of Predator Depredations	Reports Concerning Control Measure Effectiveness: Trapping No.	Trapping Percent	Govt. Hunter No.	Govt. Hunter Percent	Both Trapping & Govt. Hunter No.	Both Trapping & Govt. Hunter Percent	Total
Depredations Contd.	96	49.7	67	50.0	53	57.6	216
Depredations Stopped	97	50.3	67	50.0	39	42.4	203
Total	193		134		92		419

Agricultural Conflicts with Game and Fur Animals

The carrying capacity of game and fur animal habitat in agricultural areas is often determined by the extent of conflict which may be tolerated from their use; therefore, to obtain information on the status of game and fur animal damage on a statewide basis, the big game, game bird, and fur animal damage questions were included on the questionnaire. The addition of these questions undoubtedly increased interest and response and thus helped to reduce nonresponse bias in the predator segment of the survey.

The distribution, type and extent of game and fur animal damage on a statewide basis and especially by administrative districts will be treated quite generally. However, every effort has been made to retain reporting detail in the tabular presentation of data in the event that detailed analysis may be desired.

A report of one "kind" of damage involves the loss of a given crop or type of property at a given extent in which one or possibly two kinds of animals are listed responsible. Each kind of damage reported is listed in the tables dealing with the type and extent of damage for each class of wildlife.

The difficulties surrounding an accurate appraisal of growing crop losses to game animals are widely recognized, especially in states having laws which permit damage payments. Therefore, the limitations of the mail survey method for obtaining this type of information were considered in choosing three broad categories which describe the extent of damage as list, medium or heavy. As a result, quantitative expressions of public opinion were obtained concerning the extent of agricultural losses to game and fur animals.

Many respondents added lengthy notes in the remarks section of the questionnaire which stressed the fact that they were reporting losses of crops, feed, or other property only upon request and that they were definitely not complaining of damage nor implying that any real loss was received from the wild animals they enjoyed having around.

Weather Summary for 1957

It is widely recognized that weather conditions may greatly influence the activity of game animals and subsequently effect the magnitude of agricultural conflicts. Because of the variation in weather conditions over an area as large as Montana the following weather summary taken from monthly Climatological Data Bulletins (Anon., 1957) is presented on a seasonal and area basis.

Early in the winter of 1957 severe cold weather occurred with precipitation heavier than normal in the southeastern and central portions of the State and lighter than normal in the western and northeastern sections. During the winter, temperatures moderated and ranges opened to grazing with above average snow fall occurring in the northwestern portion of the State. Soil moisture was adequate in all but

south central and eastern areas. During late winter; above average precipitation occurred in south central and southwestern sections and below average precipitation was recorded in north central and northeastern areas. Temperatures moderated following a period of cold weather in early March. Cold, wet weather during early spring greatly improved soil moisture conditions in all but small sections in the northeastern and north central portions of the State and delayed the development of vegetation by a week or ten days. Winter wheat was reported in good condition and calving and lambing losses appeared no larger than usual despite the cold wet weather. Recurring moisture and warming temperatures contributed to favorable conditions for agriculture during late spring. The summer season was characterized by a continuation of the warming trend with light to moderate showers generally maintaining adequate soil moisture conditions in most areas except parts of the northeastern section of the State. Moderate crop damage from hail occurred in areas of northeastern and north central Montana, however, the distribution was spotty and not as widespread as in many previous years. Temperatures during the summer ranged well within the extremes reported in earlier years. Precipitation varied widely during late summer, from quite dry in most of the western and southwestern sections to very close to long term means in other areas. A record breaking snowfall of 13.4 inches occurred during late September in Lewis and Clark County. Harvest delays occurred in the central parts of the State because of snow and/or rain. West of the divide moisture generally remained quite short causing only fair winter wheat and range conditions. Range conditions in most other areas of the State were good with winter feed supplies adequate to plentiful.

During the fall, moisture conditions improved in the western section of the State and temperatures remained above normal in most northern areas and below normal in most southern areas. The early winter season was characterized by "open" weather east of the Continental Divide with precipitation below normal in most eastern areas where unusually windy conditions existed.

Fur Animal Damage

Agricultural damage from fur animals was reported by 20 percent of 7,428 respondents who completed the fur animal question. The sampling level and incidence of reported fur animal damage by farm and ranch operators in administrative districts are presented in Table 10. On a statewide basis two or more kinds of fur animal damage was reported by 4.2 percent of the respondents and three kinds by 0.1 percent. The highest incidence of agricultural crop and property losses from the activities of fur animals was reported by 33 percent of the total respondents in District Three (south central). On the other hand, the lowest incidence of fur animal damage was reported by 12 percent of the total farmers and ranchers reporting from District Six (northeast). As shown in Table 11, beaver were listed responsible for 83 percent of the total agricultural damage caused by fur animals. In general, therefore, the incidence of fur animal damage reported from each geographic area in the survey was largely dependent upon the quantity and quality of the beaver habitat, the level of the beaver population, and the types of agricultural land uses employed.

TABLE 10

SAMPLING LEVEL AND INCIDENCE OF REPORTED FUR ANIMAL DAMAGE
BY ADMINISTRATIVE DISTRICTS

District	Farm Units In District[1]	Units In Sample[2]	Sample Size In Percent	Conversion Factor	Units Reporting At Least One Kind Of Damage	Percent of Units Reporting at Least One Kind of Damage	Units Reporting At Least Two Kinds of Damage	Percent of Units Reporting at Least Two Kinds of Damage	Units Reporting Three Kinds of Damage	Percent of Units Reporting Three Kinds of Damage
One (Northwest)	3902	678	17.38	5.75	116	17.1	14	2.1	1	0.1
Two (Southwest)	2643	456	17.25	5.80	143	31.4	27	5.9		
Three (South Central)	3437	724	21.06	4.75	238	32.9	61	8.4	3	0.4
Four (North Central)	6914	1742	25.20	3.97	335	19.2	87	5.0	8	0.5
Five (Central)	4412	900	20.40	4.90	217	24.1	61	6.8	5	0.6
Six (Northeast)	7827	1946	24.86	4.02	237	12.2	25	1.3	2	0.1
Seven (Southeast)	3926	982	25.01	4.00	200	20.4	37	3.8	5	0.5
TOTAL	33061	7428	22.47	4.45	1486	20.0	312	4.2	24	0.3

1 1954 Farm census figure, U. S. Bureau of the Census
2 Farm units with useable information on fur question

TABLE 11

TYPE AND EXTENT OF FUR ANIMAL DAMAGE
MAIL SURVEY
STATEWIDE

Fur Animal Responsible	Extent of Damage	Agricultural Crop or Property Reported Damaged: Tree Cutting No.	%	Irrigation No.	%	Land Flooding No.	%	Reservoir No.	%	Field Flooding No.	%	Streambank No.	%	Livestock No.	%	Grain No.	Crop No.	%	Fence No.	Unk. No.	Total No.	%
	Light	132	25	92	25	85	26	17	50	23	21	17	31	5	24	3	6	38	2	23	405	27
Beaver	Medium	186	36	124	33	116	35	4	12	36	33	13	24	5	24		6	38	4	14	508	33
	Heavy	146	28	107	29	95	29	9	26	31	28	19	34	6	29		3	19		8	424	28
	Unknown	59	11	50	13	32	10	4	12	19	17	6	11	5	24	1	1	6		6	183	12
	TOTAL	523		373		328		34		109		55		21		4	16		6	51	1520	
	% OF TOTAL		34		24		22		2		7		4		1		1			3		81
	Light	5	26	35	40	6	50	57	42	1						2	5			2	113	41
Muskrat	Medium	7	37	29	33	5	42	28	21			1								2	72	26
	Heavy	5	26	14	16			27	20	1		2									49	18
	Unknown	2	10	10	11	1	8	23	17	1										2	39	14
	TOTAL	19		88		12		135		3		3				2	5			6	273	
	% OF TOTAL		7		32		4		49		1		1			1		2		2		14
	Light			7	20					2										2	11	24
Beaver &	Medium	1		17	50			1													19	41
Muskrat	Heavy			6	18							1								1	8	17
	Unknown			4	12	1		2												1	8	17
	TOTAL	1		34		1		3		2		1								4	46	
	% OF TOTAL		2		74		2		6		4		2							9		2
	Light			1	20												2	8			3	9
Raccoon	Medium			2	40												3	12		1	6	17
	Heavy			1	20	2											8	31			11	31
	Unknown			1	20	1											13	50			15	43
	TOTAL			5		3											26			1	35	
	% OF TOTAL				14		9											74		3		2
GRAND TOTAL		543		500		344		172		114		59		21		6	47		6	62	1874	
PERCENT OF TOTAL		29		27		18		9		6		3		1			3			3		

The greatest incidence of beaver damage was reported from Districts Two and Three in the southwestern section of the State where nearly one third of the respondents listed some problem with fur animals, of which 87 and 89 percent in the respective areas pertained to beaver. In these areas containing high quality beaver habitat, diversified farming and ranching on irrigated acreage represent major agricultural operations. These forms of intensive land use are obviously highly subject to conflict from beaver.

The type and extent of fur animal damage reported on a statewide basis is presented in Table 11. As shown in the table, a wide variety of agricultural property is subject to disturbance by beaver, muskrat and raccoon. The latter is not legally classified as a fur animal in the State but is included in this category on the basis of popular consideration and reporting. Twenty-nine percent of the total kinds of property damage reports involved the cutting of trees and brush by beaver and to a negligible extent by muskrat. In most cases where additional details were given, the farm operator was mainly concerned about a loss of shelter for livestock rather than a loss of timber or firewood. Damage to irrigation structures was reported next in order of frequency. Twenty-nine percent of the total fur animal damage involved the disturbance of irrigation structures. Plugged irrigation intakes, head gates and ditches from streams, reservoirs and canals, as well as breaks in ditches and canals from burrowing, were included in this category. Reservoir damage listed in nine percent of the total reports may have involved irrigation or stock watering structures in which muskrat or beaver burrowed in dikes or dams. Land and field flooding amounted to 24 percent of the total kinds of damage reported. Dam building activities of beaver were usually indicated responsible, however, some flooding was reported to occur because of plugged or tunneled ditches. Pastures and hay meadows were included under land flooding and cultivated crops under field flooding. Grain and crop losses amounting to three percent of the total reported property damage may have been caused by feeding, trampling or land flooding activities of raccoon, beaver or muskrat. Erosion damage to stream banks from burrowing activities of beaver or muskrat was listed in three percent of the reports. The livestock damage indicated by one percent of the total damage reports generally involved cattle falling through the ice of beaver ponds, but some reports involved the loss of livestock water during cold weather periods when normally open streams had been dammed up by beaver and frozen over. In three percent of the total fur animal damage reports the kind of property was omitted, although the animal responsible and extent of damage were usually listed.

As mentioned earlier, the beaver is shown to be the most important fur animal involved in agricultural damage. Of the total damage types reported, beaver alone were listed in 81 percent, muskrat in 14 percent, beaver and muskrat in 2 percent, and raccoon in 2 percent.

The distribution of fur animal damage by administrative districts which is listed in Tables A-18 through A-25 shows the highest proportion of muskrat damage reported from Districts One (northwest)

and Six (northeast) and raccoon damage highest in District Seven (southeast). The higher proportions of fur animal damage concerning beaver were reported from Districts Two (southwest), and Three (south central).

The extent of fur animal damage reported on a statewide basis in relation to the type of crop or property damaged and the species responsible is shown in Table 11. Respondents considered the extent of their crop losses from raccoons the heaviest and the extent of their property and crop damage from muskrats the lightest. Thirty-one percent of the raccoon damage was listed in the heavy category, 28 percent of the beaver damage in the heavy category, but only 18 percent of the muskrat damage was reported as heavy. The recent increase in raccoon numbers and extension of range in the State has probably caused farmers to be unusually aware of crop damage caused by raccoon, consequently, they may have been more inclined to evaluate raccoon damage in the heavy category. A number of the kinds of property damage from beaver were also evaluated as heavy. For example, 34 percent of the total reports of stream bank damage, 29 percent of the land flooding damage, and 28 percent of both the tree cutting and field flooding damage from beaver were listed in the heavy category by respondents.

Although 20 percent of the respondents listed some problem with fur animals, only 26 percent of the damage was evaluated as heavy. Beaver were involved in over eight out of every ten fur animal damage reports which mainly concerned tree cutting, irrigation structures and land flooding. Beaver problems appear more pronounced in the southwestern section of the State where in Districts Two and Three, respectively, 31 and 33 percent of the respondents reported some damage from fur animals, of which nearly 90 percent concerned beaver. Muskrat damage to reservoirs and dikes represents a problem most frequently experienced by landowners in the northwest and northeast (Districts One and Six) where 28 and 24 percent of the fur animal damage reports, respectively, dealt with muskrat. Raccoon damage to crops appears mainly restricted to the southeast (District Seven) where it was listed in 10 percent of the total fur animal damage reports.

Big Game Damage

The frequency of occurrence of big game damage reported from a sample of over one out of five farm and ranch operators in the State is shown to be 31 percent in Table 12. The highest incidence of damage was reported in District Seven (southeast) where 50 percent of the respondents listed some loss of crops, stored feed or other property to big game animals. On the other hand, the lowest incidence of big game damage was reported by 21 percent of the respondents in District Two (southwest). More than one kind of big game damage was listed by 10 percent of the respondents, however, only 1.7 percent reported three kinds of damage.

The type of crop, stored feed, or property losses to big game animals by species is listed on a statewide basis in Table 13 and by administrative districts in Table A-26 through A-32. The frequency of occurrence of crops or other property listed in the damage reports from throughout the State is 39 percent for grain, 19 percent for alfalfa, 14 percent for haystack, 9 percent for hay, 6 percent for range, 5 percent for corn, and

TABLE 12

THE SAMPLING LEVEL AND INCIDENCE OF REPORTED BIG GAME DAMAGE BY ADMINISTRATIVE DISTRICTS

District	Farm Units In Districts[1]	Units in Sample[2]	Sample Size In Percent	Conversion Factor	Units Reporting at Least One Kind of Damage	Percent of Units Reporting at Least One Kind of Damage	Units Reporting At Least Two Kinds of Damage	Percent of Units Reporting at Least Two Kinds of Damage	Units Reporting Three Kinds of Damage	Percent of Units Reporting Three Kinds of Damage
One (Northwest)	3902	680	17.43	5.74	171	25.1	47	6.9	9	1.3
Two (Southwest)	2643	459	17.37	5.76	96	20.9	32	7.2	5	1.1
Three (South Central)	3437	733	21.33	4.69	259	35.3	76	10.4	14	1.9
Four (North Central)	6914	1751	25.32	3.95	508	29.0	179	10.2	31	1.8
Five (Central)	4412	901	20.42	4.90	250	27.7	103	11.4	15	1.7
Six (Northeast)	7827	1943	24.82	4.03	510	26.2	118	6.1	18	0.9
Seven (Southeast)	3926	980	24.96	4.01	493	50.3	198	20.2	34	3.5
TOTAL	33061	7447	22.52	4.44	2287	30.7	753	10.1	126	1.7

1 1954 Farm census figure, U. S. Bureau of the Census
2 Units with useable information on big game question

TABLE 13
TYPE OF BIG GAME DAMAGE
STATEWIDE

Animal Responsible	Manner Damaged	Crop or Property Reported Damaged by Farm & Ranch Operators										
		Grain	Alfalfa	Haystack	Hay	Range	Corn	Fence	Garden	Beets	Tree	Total
Deer	Grazing	293	234		178	50	77		79	14	5	930
	Feeding	12	150	364	18	4	12			1	34	595
	Trampling	113	12	10	17			16	1	1		170
	Gr. & Tramp.	64	15	1	1		1			1		83
	TOTAL	482	411	375	214	54	90	16	80	17	39	1778
	PERCENT TOTAL	27	23	21	12	3	5	1	4	1	2	56
Antelope	Grazing	221	61		31	79	28		3			423
	Feeding	7	32	7	1		3					50
	Trampling	278	6	2	5	2	1	32		1		327
	Gr. & Tramp.	64	4			2	1		2			73
	TOTAL	570	103	9	37	83	33	32	5	1		873
	PERCENT TOTAL	65	12	1	4	10	4	4	1			28
Elk	Grazing	4	3		6	12	1		3			29
	Feeding	1		31	5							37
	Trampling	4		1	1			27				33
	Gr. & Tramp.	1										1
	TOTAL	10	3	32	12	12	1	27	3			100
	PERCENT TOTAL	10	3	32	12	12	1	27	3			3
Deer and Antelope	Grazing	86	28		10	20	22		5			171
	Feeding	2	35	10	2		1					50
	Trampling	29	4		1	2		5				41
	Gr. & Tramp.	21	1				1					23
	TOTAL	138	68	10	13	22	24	5	5			285
	PERCENT TOTAL	48	24	4	5	8	8	2	2			9
Deer and Elk	Grazing	14	14		14	14						56
	Feeding	2	2	21	2						2	29
	Trampling	1	1					7	1			10
	Gr. & Tramp.	3			1	1						5
	TOTAL	20	17	21	17	15		7	1		2	100
	PERCENT TOTAL	20	17	21	17	15		7	1		2	3
Moose	Feeding			8								8
	Trampling				1			2				3
	TOTAL			8	1			2				11
	PERCENT TOTAL			73	9			18				0
GRAND TOTAL		1220	602	455	294	186	148	89	94	18	41	3147
PERCENT TOTAL		39	19	14	9	6	5	3	3	1	1	

3 percent or less each for fence, garden, beets, and trees. Deer were reported responsible in 56 percent of the total damage reports which mainly involved grain, alfalfa and haystacks. Antelope damage comprising 28 percent of the total big game damage reported was most often related to the loss of grain through grazing and trampling. Elk listed responsible in three percent of the total big game damage reported were primarily involved in damage to haystacks and fences. Less than one percent of the total reports concerned moose damage which also involved haystacks and fences. Deer and antelope were both listed responsible in nine percent of the total big game damage reports. The remaining three percent of the total reports involved both deer and elk.

The distribution of big game damage by species in administrative districts is shown in Tables A-26 through A-32. The greatest proportion of total damage reports involving deer amounted to 82 percent in District One (northwest). Antelope were included in about half the damage reports from the central and eastern sections of the State. Forty-three percent of the total big game damage reported in District Six (northeast) involved antelope and an additional eight percent concerned both antelope and deer. Hay, range, and fence damage from elk in District Two (southwest) amounted to 25 percent of the total big game damage reported from that area. Agricultural damage from moose was reported in only two districts, Two (southwest) and Three (south central). Three percent of the total damage reports in District Three related to moose.

The manner in which crops were reported to be damaged may indicate whether a growing crop, mature crop or stored crop was involved. For example, grazing obviously indicates the loss of vegetative portions of growing plants; feeding generally indicates the loss of ripened grain, alfalfa seed, or in the case of hay the loss of cured forage; and trampling may relate to the shelling out of grain, flattening of forage crops or physical damage to haystacks or gardens. In the cases of trampled grain, most respondents described their losses as being ripened grain, rather than physical damage to growing plants or compaction of the soil during the growing season.

The information in Table 14 shows that the majority of survey respondents evaluated the extent of their agricultural losses to big game animals as light or medium. Only 18 percent of the total big game damage reports were listed as being heavy. Damage to gardens was most frequently evaluated as heavy, as was crop damage by both deer and elk. Fifty-eight percent of the garden damage concerning deer was reported in the heavy category.

The lightest extent of crop damage from big game animals involved grain. Over 60 percent of deer and/or antelope damage to grain was listed as light. The extent of big game damage by administrative districts presented in Tables A-33 through A-39 shows the heaviest extent of damage was reported from District Seven (southeast) and the lightest extent from Districts Five (central) and Six (northeast).

TABLE 14

EXTENT OF BIG GAME DAMAGE
STATEWIDE

Animal Responsible	Extent of Damage Reported	Agricultural Property Reported Damaged: Grain No.	%	Alfalfa Hay No.	%	Hay No.	%	Haystack No.	%	Garden No.	%	Tree No.	%	Range No.	%	Corn No.	%	Fence No.	%	Beets No.	%	Total No.	%
Deer	Light	299	64	137	34	105	51	122	38	19	26	8	22	21	48	35	40	5		14	82	765	46
	Medium	124	27	153	38	71	34	143	44	12	16	11	30	19	35	32	36	5		2	12	572	34
	Heavy	41	9	110	28	30	15	56	17	42	58	17	47	14	26	21	24			1	6	332	20
	TOTAL	464		400		206		321		73		36		54		88		10		17		1669	
Antelope	Light	367	62	39	38	15	42	2	28	2	40			36	49	8	25	11	35			480	55
	Medium	170	29	39	38	15	42	3	43	2	40			29	40	11	34	16	52			285	33
	Heavy	51	9	24	24	6	17	2	28	1	20			8	11	13	41	4	13	1		110	13
	TOTAL	588		102		36		7		5				73		32		31		1		875	
Elk	Light	5	50	2		2	20	14	44	1				4	31			7	33			35	38
	Medium	2	20			4	40	11	34					7	54			11	52			35	38
	Heavy	3	30			4	40	7	22	2				2	15	1		3	14			22	24
	TOTAL	10		2		10		32		3				13		1		21				92	
Deer and Antelope	Light	89	65	22	32	6	43	6	60	1	20			7	37	6	28	1	33			138	50
	Medium	34	25	25	37	5	36	3	30	1	20			11	58	8	38	1	33			88	32
	Heavy	13	10	21	31	3	21	1	10	3	60			1	5	7	33	1	33			50	18
	TOTAL	136		68		14		10		5				19		21		3				276	
Deer and Elk	Light	6	32	7	41	5	28	7	35			1		4	31			2	40			32	34
	Medium	10	53	7	41	5	28	6	30	1				3	23			2	40			34	36
	Heavy	3	16	3	18	8	44	7	35					6	46			1	20			28	30
	TOTAL	19		17		18		20		1		1		13				5				94	
Moose	Light					1		2	25									1				4	36
	Medium							3	38									1				4	36
	Heavy							3	38													3	27
	TOTAL					1		8										2				11	
GRAND TOTAL	Light	766	63	207	35	134	47	153	38	23	26	9	24	72	42	49	34	27	37	14	78	1454	48
	Medium	340	28	224	38	100	35	169	42	16	18	11	30	69	40	51	36	36	50	2	11	1018	34
	Heavy	111	9	158	27	51	18	76	19	48	55	17	46	31	18	42	30	9	12	2	11	545	18
	TOTAL	1217		589		285		398		87		37		172		142		72		18		3017	

In evaluating the importance of agricultural damage caused by big game animals on a statewide basis it appears quite significant that, first, only 31 percent of the survey respondents indicated some loss to big game animals, and second, that only 18 percent of agricultural property losses reported were considered heavy, or less than 7.3 percent of 7,447 farm and ranch operators reported heavy damage from big game animals.

Game Bird Damage

Crop damage from game birds on a statewide basis was found to be incidental in comparison with other agricultural problems concerning wildlife. Only six percent of the 7,477 respondents completing the game bird damage question reported a noticeable crop loss through the activity of game birds. The sampling level and incidence of reported game bird damage by administrative districts is presented in Table 15. Few reports were made of multiple kinds of game bird damage. On a statewide basis only one percent of the respondents listed two kinds, and only one tenth of a percent indicated three kinds. The highest incidence of damage was reported by 11 percent of the respondents in District One (northwest). Conversely, the lowest damage incidence was reported by three percent of the respondents in District Three (southwest).

On a statewide basis the kind of crop damage reported in relation to game bird species responsible is shown in Table 16. Eighty percent of the total reports of crop losses involved grain. In detail this includes wheat 20 percent, barley 6 percent, oats 4 percent, swathed grain 7 percent, and the generalized grain category 43 percent. Garden damage was listed in 13 percent of the total reports and potatoes, beets and hay each listed in 2 percent. Pheasants represented the game bird species most frequently reported responsible for crop damage. Sixty-five percent of the total damage reports concerned pheasants; 24 percent, ducks; 5 percent, geese; 5 percent, grouse; and 1 percent, hungarian partridge. A protective or possessive attitude may be reflected in the low incidence of reported grouse damage. Farm residents during personal interviews did not appear concerned about crop damage from native grouse, however, ample concern was expressed about damage from the exotic pheasant species. The more important factors which place the pheasant uppermost in the position as a crop competitor may include distribution, density, habitat requirements, food habits and flocking behavior. The manner in which crops were damaged by game birds is not indicative of seasonal use or specific crop damage as was the case with big game, therfore, only reporting detail is reflected in this segment of the tabular data.

The extent of the reported damage shown in Table 16 indicates further that bird damage over the state is of incidental importance. Only 13 percent of the damage reports were listed as heavy, while 67 percent were listed as light.

The distribution of reported game bird damage to crop classes in relation to birds responsible by administrative districts is presented in Tables A-40 through A-46. The greatest proportion of total

TABLE 15

SAMPLING LEVEL AND INCIDENCE OF REPORTED GAME BIRD DAMAGE
BY ADMINISTRATIVE DISTRICTS

District	Units in District	Units in Sample	Sample Size In Percent	Units Reporting At Least One Kind of Damage	Percent Reporting At Least One Kind of Damage	Units Reporting At Least Two Kinds of Damage	Percent Reporting At Least Two Kinds of Damage	Units Reporting Three Kinds of Damage	Percent Reporting Three Kinds of Damage
One (Northwest)	3902	683	17.5	73	10.7	15	2.2		
Two (Southwest)	2643	462	17.5	16	3.5				
Three (South Central)	3437	737	21.4	22	3.0	4	0.5	1	0.1
Four (North Central)	6914	1758	25.4	115	6.5	25	1.4	3	0.2
Five (Central)	4412	906	20.5	44	4.9	6	0.7		
Six (Northeast)	7827	1945	24.8	132	6.8	22	1.1	3	0.2
Seven (Southeast)	3926	986	25.1	48	4.9	7	0.7		
TOTAL	33061	7477	22.6	450	6.0	79	1.0	7	0.1

TABLE 16

TYPE OF GAME BIRD DAMAGE
STATEWIDE

Bird Responsible	Manner Damaged	Wheat	Barley	Oats	Grain	Swathed Grain	Potatoes	Beets	Garden	Hay	Total
Pheasant	Feeding	49	10	11	156	7	13	13	61	3	323
	Trampling	6	2	1	8					3	20
	Soiling	1								1	2
	TOTAL	56	12	12	164	7	13	13	61	7	345
	PERCENT OF TOTAL	16	3	3	48	2	4	4	18	2	65
Grouse	Feeding	9			9				3		21
	Trampling	4			2						6
	TOTAL	13			11				3		27
	PERCENT OF TOTAL	48			41				11		5
Ducks	Feeding	26	20	5	42	27			1	1	122
	Trampling	1	2		1	1				1	6
	TOTAL	27	22	5	43	28			1	2	128
	PERCENT OF TOTAL	21	17	4	34	22			1	2	24
Geese	Feeding	11		3	8	2			1	2	27
	TOTAL	11		3	8	2			1	2	27
	PERCENT OF TOTAL	41		11	30	7			4	7	5
Hungarian	Feeding	1							4		5
	TOTAL	1							4		5
	PERCENT OF TOTAL	20							80		1
Turkey	Feeding				2						2
	TOTAL				2						2
GRAND TOTAL		108	34	20	228	37	13	13	70	11	534
PERCENT OF TOTAL		20	6	4	43	7	2	2	13	2	

EXTENT OF REPORTED DAMAGE		LIGHT	MEDIUM	HEAVY	TOTAL
	Number	345	104	67	516
	Percent	67	20	13	

bird damage reports involving pheasants amounted to 90 percent in District Five (central) and 81 percent in District Two (southwest). Ducks were named responsible for 36 percent of the total bird damage reported in District Four (north central), 28 percent in District One (northwest) and 22 percent in District Five (central). Crop damage from geese amounted to 19 percent of the total bird damage reports in District Three (south central) and 10 percent in District One (northwest). Grouse were reported responsible for crop damage in only four of the seven districts. A high of 11 percent of the bird damage reports pertained to grouse in District Seven (southeast). Turkey damage was reported only from District Seven and amounted to four percent of the total bird damage reports.

RESULTS OF PERSONAL INTERVIEW CHECK SURVEY

A comparison of the personal interview check survey findings with those of the mail survey shows some effects of reporting and sampling biases which affect the reported loss of livestock and poultry in the mail survey. The representative characteristics of the incidence, type and extent of big game, game bird and fur animal damage reported in the mail survey, however, are strongly supported by the comparable data obtained from the personal interview survey.

The incidence of predator depredations and the expanded number of livestock and poultry reported lost in the mail and personal interview surveys are given in Tables A-47 through A-50. A significantly greater proportion of farm units with predator depredations was found in both counties from the personal interview survey than was reported in the mail survey. The formula which expresses the ratio of the difference between two percentages to the standard deviation of the difference taken from Davis and Zippin (1954:171) was employed in the following analysis. Assuming losses to predators are independent, the difference between the percent of farm units with losses from the mail survey and from the personal interview survey was highly significant (Richland County $R = 6.5$, Valley County $R = 2.9$). These differences largely result from the greater reporting detail produced by the personal interview method. The occurrence of a predator depredation which may only involve the loss of one or two chickens was determined through detailed questioning in the personal interview survey. On the other hand, the same loss may not have been recalled nor considered sufficiently important to report by mail survey respondents. The tendency for farm operators to recall minor poultry losses during the last phase of an interview also supports the belief that these losses often were not recalled nor reported in the mail survey.

For the same reason the total number of poultry reported lost to predators was much higher in the personal interview survey than the mail survey. Frequency distributions of poultry losses from both surveys show that a greater incidence of small numbers of poultry were reported in the personal interview survey. For example, in the check areas losses of less than 10 chickens were reported in 41 instances from the personal interview survey but only in 15 instances from the mail survey. Average losses in every poultry class from both check areas

were also lower in the personal interview survey. On the other hand, greater numbers of livestock were reported lost to predators by respondents of the mail survey than by farmers and ranchers interviewed in the check survey. It appears that livestock losses reported in the mail survey are inflated due to the inclusion of losses from years other than 1957. It was noted repeatedly during personal interviews that livestock losses to predators during 1955, 1956 and especially recent losses during 1958 were readily reported and described until the desired reporting period of 1957 was repeated and stressed.

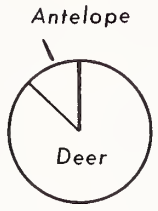
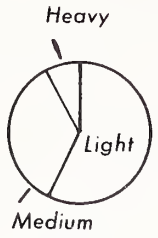
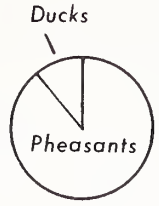
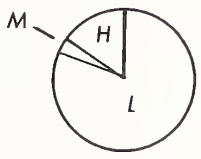
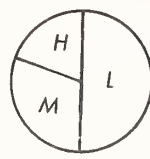
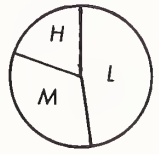
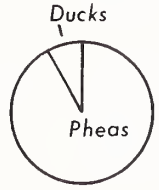
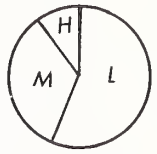
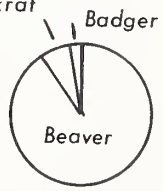
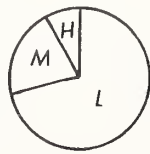
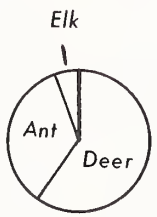
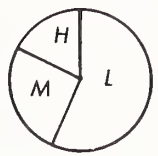
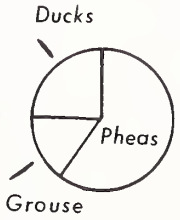
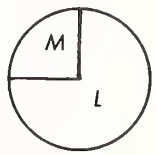
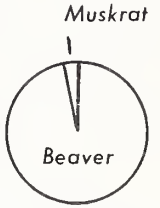
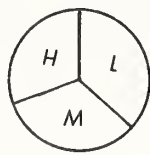
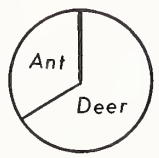
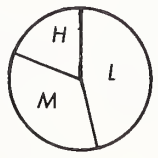
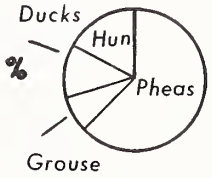
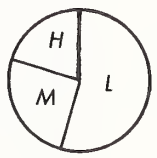
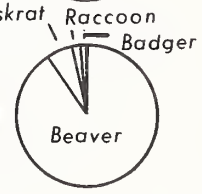
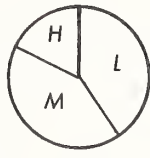
Considerable variation is evident between the mail and personal interview data which indicate the relative importance of predator species responsible for losses. This suggests that the sample may not be adequate for comparison in such detail at the county level, however, this degree of comparison may be warranted at the administrative district levels which include from five to ten counties. Skunk depredations reportedly involved the highest losses of poultry in both check areas according to the mail and personal interview survey figures. Here the similarity generally ceases. The most striking difference in the importance of the remaining predator categories between the mail and personal interview data involves the near absence of unknown predators listed by mail survey respondents and the great frequency with which "unknown" predators were reported by farmers and ranchers interviewed. The second highest loss of livestock and poultry in both areas from the personal interview survey and the lowest loss in both areas from the mail survey were attributed to unknown predators. It seems evident that mail survey respondents are more prone to guess which predator might be responsible for their losses. Unfortunately the data are inadequate for a "scape goat" order of importance to be indicated. How much this type of reporting bias may affect the statewide mail survey is in the realm of speculation.

Fewer variables appear involved in reporting the incidence, type and extent of other wildlife conflicts with agriculture, for much closer agreement is evident between the findings of the two surveys presented in Figure 2 which deal with this subject. Aspects of big game damage obtained through both survey methods are listed in detail in Table A-51 through A-54. The greatest level of agreement between all aspects of damage from both surveys occurs with big game. Only minor variations are evident in the type and extent of damage listed and in the kind of animals involved. Assuming losses to big game are independent, no significant difference was found between the percent of farm units reporting big game damage in either of of the check areas ($R = 0.4$ Richland Co., $R = 0.2$ Valley Co.). Although more variable than that for big game, the game bird damage reported from both survey methods is quite similar. Again following the same assumptions, no significant difference was found between the percent of farm operators reporting game bird damage in the two surveys ($R = 0.7$ Richland Co., $R = 1.4$ Valley Co.). Detailed tabulations of game bird damage presented in Tables A-55 through A-58 also show agreement between the kind of crops involved in damage reports from the two surveys. Fur animal damage from the two sources is in general agreement. More reporting detail is evident from the personal interview survey data in Tables A-59 and A-60 where both the kind of animals responsible and the type of crops reported damaged were more numerous than from the mail survey. The percentage occurrence of fur animal species reported responsible from the

Figure 2

AGRICULTURE - WILDLIFE CONFLICTS

MAIL SURVEY AND PERSONAL INTERVIEW INFORMATION COMPARED

	SAMPLE SIZE	BIG GAME			GAME BIRDS			FUR ANIMALS		
		FARM UNITS REPORTING DAMAGE	ANIMALS INVOLVED	EXTENT OF DAMAGE	FARM UNITS REPORTING DAMAGE	ANIMALS INVOLVED	EXTENT OF DAMAGE	FARM UNITS REPORTING DAMAGE	ANIMALS INVOLVED	EXTENT OF DAMAGE
RICHLAND COUNTY										
MAIL SURVEY	$\frac{204 \times 100}{996} = 20.5\%$	20.2 %			18.2 %			11.1 %		
PERSONAL INTERVIEW SURVEY	$\frac{198 \times 100}{996} = 19.9\%$	18.6 %			15.7 %			19.6 %		
VALLEY COUNTY										
MAIL SURVEY	$\frac{278 \times 100}{1014} = 27.4\%$	24.5 %			6.1 %			14.0 %		
PERSONAL INTERVIEW SURVEY	$\frac{208 \times 100}{1014} = 20.5\%$	25.5 %			9.6 %			22.1 %		

surveys is nearly the same for both areas, however, more variation is indicated in the type and extent of property damage reported. The percentage of farm operators reporting damage from fur animals in both surveys was found significantly different at the 95 percent level of confidence. (R = 2.4 Richland Co., R = 2.3 Valley Co.). This statement is correct providing reports of fur animal damage are independent. The assumption of independence appears justified as sampling without replacement was employed in both methods which are unrelated as to the selection of a given sample unit.

Sampling Variability

Rather detailed comparisons of mail survey information were anticipated early in the survey, particularly with reference to predator depredation data in areas where the personal interview check survey was to be conducted. The 30 percent sampling level was used so that the expected sampling variability might be comparable to that of the U. S. Bureau of the Census (Anon. 1950: XXVIII).

With a 20 percent sample return, assuming the probability of predator depredations to be 25 percent (based on pilot study) and a check area county to contain 1,000 farm units, an approximation of the standard error would be 30 (Anon. 1950: XXIX) for an estimated number of 250 farm units with predator losses. Consequently, at the 95 percent confidence level the total farm units with predator depredations would be less than 60 from the estimated 250.

Since a 22 percent sample of the 33,000 farm units in the State was obtained in the mail survey, some estimates of sampling variability may be given in the form of examples. Various types of response bias and the lack of uniform sampling in the mail survey, however, are not considered.

The number of farm units in the State with predator losses may be expanded to become 5,860 (Table 2) with an approximated standard error of 130 (Ibid). Thus, in 19 cases out of 20 the number of farm units in the State with predator losses during 1957 should be within 260 of 5,860. Obviously, the reporting nonresponse, and nonuniform sampling bias in the mail survey does not allow this degree of reliability to be realized.

According to the replies from the land posting question, 763 respondents reported that public hunting was not allowed on their land. Based upon a 19.3 percent sample of farm units with data, the number of farms not allowing hunting was expanded to become 4,000 (Table 17). With an approximated standard error of 120 (Ibid) at the 95 percent confidence level the number of farm units not allowing public hunting may be expected to be within 240 of 4,000,or within about six percent. At the maximum confidence limits, the total acreage closed to hunting may be expected to vary by 530,000 acres from the expanded 8,050,000 acre figure.

Land Posting

Eight million acres of owned and leased land were posted against public hunting in Montana during 1957. This information is based upon answers to question 11 on the mail survey form which read, "was hunting by the public allowed on your place during 1957?" As shown in Table A-62, 12 percent of the 6,377 respondents living in areas not affected by legal restrictions reported that their land was closed to public hunting; 26 respondents stated their land was in a refuge or reservation; and 404, omitted question one dealing with total acreage, thus their posting status was not included in the projection of data involving acreage.

The sampling level and distribution of farm units with land closed to hunting according to administrative districts are presented in Table 17. The sampling level of farm units with data on both acreage and hunting status equalled 19.3 percent statewide and ranged from a low of 14.4 percent in District Two (southwest) to a high of 22.0 percent in District Seven (southeast). Public hunting was not allowed by 12.0 percent of the total respondents throughout the State which according to the data in Table 18 involved 9.4 percent of the total owned and leased acreage. The highest incidence of posting by farm operators in administrative districts was 15.2 percent in District Three (south central); the lowest, 10.3 percent in District Four (north central). The highest percentage of total acreage closed to hunting was 12.8 in District Two (southwest). Major differences occur between the percentage of total farm units and percentage of total acreage closed to hunting in Districts One and Three. These differences appear to be caused by the presence of many small farm units on which public hunting may not be feasible. Figures on average farm size open and closed to hunting also bear this out.

The information concerning the number of farms and amount of acreage closed to hunting in relation to agricultural types presented in Table A-61 shows the highest incidence of posting was reported from agricultural units engaged in general farming. Hunting was not allowed on 14 percent of the farm units in this category, nor on 12.2 percent of the units engaged in range livestock operations. The higher percentages of total acreage closed to hunting according to agricultural types amounted to 10.3 percent in the range livestock type and 9.3 percent in the general farming category. It seems unusual that the lowest incidence of posting (8.6 percent) as well as the lowest percent of total acreage posted (2.6 percent) were reported from farm units engaged in irrigated cash crop farming which represents one of the most intensive forms of agricultural use.

More detailed information concerning land posting against hunting was obtained in the personal interview check survey. The number of farm units posted with and without permission in relation to the extent of each unit posted is shown in Table A-63. Although the incidence of posting was nearly twice as high in Richland County as Valley County, about the same proportion of units in each area was posted with permission as without permission; the latter case being comparable to the "public hunting not allowed" category of the mail survey. The 12 percent incidence of posting reported in the mail survey from the Northeast District which includes these two counties is midway between the personal interview figures of 16 percent from Richland County and 8 percent from Valley County. The pattern of

TABLE 17

SAMPLING LEVEL AND DISTRIBUTION OF FARM UNITS WITH LANDS CLOSED TO HUNTING
BY ADMINISTRATIVE DISTRICTS

District	Farm Units in District[1]	Farm Units with Data	Percent with Data	Public Hunting Not Allowed				
				Farm Units in Sample			Projected Data	
				Number	Percent	Average Size	Units Posted	Total Acreage Posted
One	3902	576	14.8	82	14.2	316	554	175,064
Two	2643	381	14.4	56	14.7	1076	389	418,564
Three	3437	646	18.8	98	15.2	1837	522	958,914
Four	6914	1513	21.9	156	10.3	2215	712	1,577,080
Five	4412	791	17.9	88	11.1	2090	490	1,024,100
Six	7827	1607	20.5	186	11.6	2043	908	1,855,044
Seven	3926	863	22.0	97	11.2	4643	440	2,042,920
Statewide	33061	6377	19.3	763	12.0	2218	3967	8,798,806
							4015[2]	8,051,686[2]

1 1954 Federal Census Figures

2 Column Total
(Stratified - most representative)

TABLE 18

HUNTING STATUS OF LAND

District	Hunting Allowed			Hunting Not Allowed			Total Numbers			Percent of Total Not Allowing Hunting	
	Units	Acres	Average Acreage	Units	Acres	Average Acreage	Units	Acres	Average Acreage	Units	Acreage
One	494	775,706	1,570	82	25,888	316	576	801,594	1,392	14.2	3.2
Two	325	410,636	1,263	56	60,256	1,076	381	470,892	1,236	14.7	12.8
Three	548	2,112,453	3,855	98	179,392	1,837	646	2,291,845	3,548	15.2	7.8
Four	1,357	3,476,913	2,562	156	345,581	2,215	1,513	3,822,494	2,526	10.3	9.0
Five	703	1,921,147	2,733	88	183,934	2,090	791	2,105,081	2,661	11.1	8.7
Six	1,421	3,811,676	2,682	186	447,024	2,043	1,607	4,258,700	2,650	11.6	10.4
Seven	766	3,768,797	4,920	97	450,429	4,643	863	4,219,226	4,889	11.2	10.6
STATEWIDE	5,614	16,277,328	2,899	763	1,692,504	2,218	6,377	17,969,832	2,818	12.0	9.4

posting land without permission in the two counties was found to be quite different. In Richland County two-thirds of such posting included all the land on each farm; the remaining one-third included nearly equal instances of posting around buildings and around livestock. In Valley County two-thirds of the posting without permission was around livestock; only two instances involved buildings; and nearly one-third included all of the land in the farm unit. The mail survey figure of total acreage closed to hunting is based upon the average acreage of farm units which did not allow public hunting or which were entirely posted, therefore, the acreage on farms posted only around buildings or around livestock is not included. Moreover, the amount of public land upon which hunters are denied access by surrounding landowners is not represented. Considering these omissions, the mail survey figure of eight million acres closed to public hunting is extremely conservative.

Conclusions:

The representative nature of the information from mail survey respondents is supported by agricultural data from the U.S.D.A. Marketing Service and the personal interview check survey, although the livestock data suggest the larger ranch operations may be more than adequately represented in the mail survey sample.

Details of agricultural conflicts concerning big game, game birds and fur animals determined from the mail survey were found quite reliable when compared with personal interview data; however, predator depredation material was found to be influenced by response bias. Poultry losses were apparently biased negatively because of a lack of reporting detail which resulted from minor poultry losses not being reported. Conversely, livestock losses appear to have been inflated by both reporting and sampling bias.

Losses of livestock through predator depredations were found to be of minor importance compared with losses to disease, plant poisoning and accidents. Although sheep undoubtedly represented the class of livestock most vulnerable to predation, only 11 sheep were shown to be lost to predators for every 89 lost from all other causes.

Losses to predators in relation to total livestock and poultry populations also were generally of minor significance as they varied from a low for cattle of one per 10,000 to an intermediate for sheep of one per 100 to a high for turkeys of six and one-half per 100.

Sheep owners experienced the greatest economic loss to predators for the value of sheep reportedly lost through predator depredations equaled 67 percent of the total economic loss from predatory animals during the year. At the most, 2.4 percent of the total farm sheep production was lost through predator depredations during 1957.

The services of government hunters working under the Cooperative Predator Control Program were employed by 60 percent of the ranchers losing sheep, 27 percent of the ranchers losing cattle, and only by 6 percent of the farmers losing chickens. In the past, farmers

concerned about losses to the smaller predators have been primarily interested in expanding the bounty program. Thus, the need for a supplemental program such as the extension approach aimed at controlling damage from the smaller predators is strongly supported. No justification appears to exist for increasing the present level of the Department's financial support of the Cooperative Predator Control Program.

Fur animal damage, especially concerning beaver in irrigated areas, should not develop into an important depredation problem unless pelt prices drop considerably and cause a marked reduction in trapping pressure.

An evaluation of the incidence, type and extent of reported big game and game bird damage requires the background and experience of district management personnel.

Recommendations:

Because of the possibility of developing biased response from special interest groups, it is recommended that a similar survey not be conducted for a period of five years.

APPENDIX

TABLE A-1

MAIL SURVEY VITAL STATISTICS

33,061	Ranch and Farm Units in 1954, U. S. Bureau of the Census
10,125	Questionnaires Mailed
38	Questionnaires Unclaimed
10,087	
7,488	Useable Returns
58	Unuseable Returns
74.2	Percent Response
22.6	Percent Sample of Total Farm Units
4.42	Reciprocal (conversion factor)
6,430	Units Reporting Livestock or Poultry During 1957
85.9	Percent of Useable Returns Reporting Livestock and Poultry
1,332	Units Reported Predator Losses
20.7	Percent of Total Units with Livestock and/or Poultry Reporting Predator Losses
17.8	Percent of Total Units Reporting Predator Losses

MAIL SURVEY REMINDER CARD

Helena, Montana
April 8, 1958

Dear Sir:

We recently mailed you a form asking about wildlife damage to your crops, livestock and other property. If you haven't mailed your reply, please take a few minutes and do so now.

Even though you had no wildlife damage during 1957, your answer is important.

Please excuse this reminder if your reply is in the mail.

Your help will be appreciated.

Sincerely yours,
A. A. O'CLAIRE, DIRECTOR

Fig. A-2

TABLE A-2

LIVESTOCK AND POULTRY INVENTORY NUMBERS FROM THE MAIL SURVEY, U.S.D.A. AGRICULTURAL MARKETING SERVICE, AND FROM THE U. S. CENSUS BUREAU

	Cattle	Sheep	Hogs	Chickens	Turkeys	Ducks	Geese	Guineas	Horses	None
Mail Survey										
Reported Data										
Total Number	574,903	487,655	20,516	280,249	2,896	1,637	2,441	86	4,790	
Units Reporting	5,494	1,157	1,325	4,329	291	313	456	15	616	1,058
Average Number	104.6	421.4	15.4	64.7	10.0	5.2	5.3	5.7		
Expanded Data										
Total Number	2,650,000	2,248,000	95,000	1,292,000	13,000	7,500	11,300	400	22,100	
Units Reporting	25,327	5,334	6,108	19,957	1,341	1,443	2,102	69	2,840	4,877
U. S. Census 1954										
Average Number	86.2	326.6	9.1							
U.S.D.A.										
January 1, 1954	2,303,000	1,606,000	91,000	1,563,000						
January 1, 1958	2,294,000	1,722,000	113,000	1,484,000	6,000				88,000	

7488 Total units responding
-313 Units without livestock data
7175 Total units with livestock data

$\frac{33061}{7175}$ = 4.61 Conversion factor

TABLE A-3

COMPARISON OF LIVESTOCK AND POULTRY NUMBERS FROM MAIL SURVEY WITH U.S.D.A. MARKETING SERVICE INVENTORY JAN. 1, 1958

Class of Livestock	No. Reported in Mail Survey	Projected No. from Survey	U.S.D.A. 1958 Inventory	Difference from USDA Inventory	Percent Difference
Cattle and Calves	574,903	2,650,000	2,294,000	356,000	+15.5
Sheep and Lambs	487,655	2,248,000	1,722,000	526,000	+30.5
Hogs	20,516	95,000	113,000	18,000	-15.9
Chickens	280,249	1,292,000	1,484,000	192,000	-12.9
Turkeys	2,896	13,000	6,000	7,000	+116.7

33061 Total farm and ranch units in state.
7175 Units with known data on livestock question.

$\frac{33061}{7175}$ = 4.61 Conversion factor.

TABLE A-4

COMPARISON OF AGRICULTURAL TYPES REPORTED IN MAIL AND PERSONAL INTERVIEW SURVEYS

	Percentage of Total Farm Units Reporting Agricultural Type							
	Cash Crop	Grain	Dairy and Poultry Hogs	Range Livestock	Feeder Livestock	Fruit	General	Total Farm Units
Richland County								
Mail Survey	31	55	8	42	26	1	12	198
Personal Interview Survey	42	64	15	50	22	2		204
Valley County								
Mail Survey	8	76	7	43	2		8	278
Personal Interview Survey	24	82	3	52			1	208

TABLE A-5

DATA CONCERNING REPRESENTATIVE NATURE OF STATEWIDE MAIL SURVEY RESPONDENTS WITH REFERENCE TO FARMS WITH CATTLE AND SHEEP

Agricultural Statistics

33,061 Farms in state 1954. Census
26,724 Farms with cattle 1954.
4,916 Farms with sheep 1954.
2,294,000 Total cattle and calves, Jan. 1, 1958.
2,303,000 Total cattle and calves, Jan. 1, 1954.
1,691,000 Total sheep and lambs, Jan. 1, 1958.
1,606,000 Total sheep and lambs, Jan. 1, 1954.

Wildlife Damage Mail Survey Statistics

7,175 Useable returns with livestock information.
21.7 Per cent sample of total farms in state. *
5,496 Farms with cattle, Jan. 1, 1958.
1,157 Farms with sheep, Jan. 1, 1958.

Calculations

$\frac{5496}{7175} \times 100 =$ 76.6 per cent of survey respondents reporting cattle.

80.8 per cent of farms with cattle 1954.

$\frac{5496}{26724} \times 100 =$ 20.6 per cent of total farms with cattle responding in survey.

21.7 sampling level of survey. *

$\frac{1157}{7175} \times 100 =$ 16.1 per cent of survey respondents reporting sheep.

14.9 per cent of farms with sheep 1954.

$\frac{1157}{4916} \times 100 =$ 23.5 per cent of total farms with sheep responding in survey.

21.7 sampling level of survey. *

*Sample with complete information on livestock numbers.

TABLE A-6

COMPARISON OF EXPANDED LIVESTOCK AND POULTRY DATA FROM MAIL AND PERSONAL INTERVIEW SURVEYS WITH U.S.D.A. AND CENSUS BUREAU STATISTICS

RICHLAND COUNTY	Cattle	Calves	Sheep	Lambs	Swine	Horses	Chickens	Turkeys	Ducks	Geese	Guineas	None
Total Numbers												
Mail Survey	46,547		165,519		2,275	418	36,275	225	214	445	16	
Pers. Int. Sur.*	40,984	22,848	70,764	80,698	4,640	1,791	92,245	989	566	797	30	
1958 USDA	40,400		21,600		2,900	2,000	49,700					
Farms with Livestock												
Mail Survey	779		214		173	42	643	31	42	78	5	136
Pers. Int. Sur.	802	605	172	128	231	438	881	69	54	108	5	34
1954 Census**	838		184		346							
Average Numbers												
Mail Survey	60		772		13	10	56	7	5	6		
Pers. Int. Sur.	51	38	411	631	20	4	105	14	10	7		

VALLEY County	Cattle	Calves	Sheep	Lambs	Swine	Horses	Chickens	Turkeys	Ducks	Geese	Guineas	None
Total Numbers												
Mail Survey	62,939		49,932		1,309	575	38,539	492	246	329		
Pers. Int. Sur.*	69,474	32,974	48,148	18,691	3,263	2,429	78,192	2,344	507	903		
1958 USDA	62,800		34,500		2,300	2,000	43,700					
Farms with Livestock												
Mail Survey	751		92		171	83	638	58	46	67		213
Pers. Int. Sur.	792	697	116	100	322	470	855	74	79	95		137
1954 Census**	785		129		301							
Average Numbers												
Mail Survey	84		544		8	7	60	8	5	5		
Pers. Int. Sur.	88	47	414	186	10	5	91	31	6	10		

* Total number on ranch or farm during 1957.

** Most recent statistics available.

TABLE A-7

EXPANDED LIVESTOCK AND POULTRY LOSSES
BY DISTRICTS

District	Cattle	Calves	Sheep	Lambs	Hogs	Chickens	Turkeys	Ducks	Geese	Guineas
One	23	305	356	63	126	4448	11	167	149	126
Two	12	126	767	286	11	3488	366	240	257	
Three	117	192	4366	2834	70	4619	368	225	247	19
Four	79	100	4404	3131	63	13150	684	380	107	24
Five	10	118	2372	1738	93	13601	751	640	429	117
Six	16	32	913	482	100	20289	1118	869	336	96
Seven	4	56	1613	2570		11793	631	104	228	112
TOTAL	261	929	14791	11104	463	71388	3929	2625	1753	494

TABLE A-8

EXPANDED NUMBERS OF LIVESTOCK AND POULTRY
LOST TO PREDATOR SPECIES
DISTRICT ONE

	Cattle	Calves	Sheep	Lambs	Hogs	Chickens	Turkeys	Ducks	Geese	Guineas
Skunk						2089		115		
Coyote		40	178	34		855	11		40	
Dog	6	121	172	6		304				
Bear	17	138	6	6	126					
Bobcat				17		86			109	34
Hawk						362		52		
Owl						298				92
Mink						161				
House Cat						86				
Weasel						86				
Magpie						69				
Eagle						52				
Unknown		6								
TOTAL	23	305	356	63	126	4448	11	167	149	126

Conv. f. = 5.74

TABLE A-9

EXPANDED NUMBERS OF LIVESTOCK AND POULTRY
LOST TO PREDATOR SPECIES
DISTRICT TWO

	Cattle	Calves	Sheep	Lambs	Hogs	Chickens	Turkeys	Ducks	Geese	Guineas
Coyote		51	395	217		772	69			
Skunk						972		172	11	
Dog		6	229	46	11	784				
Bobcat				23		297	183	51	217	
Badger						114	114			
House Cat						177				
Mink						172				
Bear		34	132							
Fox						137				
Owl						63		6		
Mtn. Lion		6								
Magpie	6									
Unknown	6	29	11					11	29	
TOTAL	12	126	767	286	11	3488	366	240	257	

Conv. f. = 5.72

TABLE A-10

EXPANDED NUMBERS OF LIVESTOCK AND POULTRY
LOST TO PREDATOR SPECIES
DISTRICT THREE

	Cattle	Calves	Sheep	Lambs	Hogs	Chickens	Turkeys	Ducks	Geese	Guineas
Coyote		5	2685	1845		322	42		14	
Skunk						1901	51	5		
Bobcat		33	93	668		444	79	159	224	
Bear	103	121	1135	23	5		47			
Fox				14		878	135			19
Dog	9	23	453	23	65	420		23		
Eagle				238						
Mink						187		33		
House Cat						196				
Owl						89	14		9	
Magpie	5					56				
Hawk						47				
Badger						42				
Mtn. Lion		5								
Unknown		5		23		37		5		
TOTAL	117	192	4366	2834	70	4619	368	225	247	19

Conv. f. = 4.67

TABLE A-11

EXPANDED NUMBERS OF LIVESTOCK AND POULTRY
LOST TO PREDATOR SPECIES
DISTRICT FOUR

	Cattle	Calves	Sheep	Lambs	Hogs	Chickens	Turkeys	Ducks	Geese	Guineas
Skunk						6889	261	107	20	
Bobcat			190	130		3203	194		63	24
Coyote	4	28	1315	1303		699	150	87	16	
Bear	55	28	2690	205						
Eagle		12		1319						
Badger				118		833		55		
Dog	16	32	205			438	32	79		
Owl						79				
Mink						186		24	8	
Weasel						166		20		
Fox					63	99				
Magpie						107				
Hawk						375				
Mtn. Lion			4							
Unknown	4			56		76	47	8		
TOTAL	79	100	4404	3131	63	13150	684	380	107	24

Conv. f. = 3.95

TABLE A-12

EXPANDED NUMBERS OF LIVESTOCK AND POULTRY
LOST TO PREDATOR SPECIES
DISTRICT FIVE

	Cattle	Calves	Sheep	Lambs	Hogs	Chickens	Turkeys	Ducks	Geese	Guineas
Skunk						4568	54	34	24	29
Bobcat		24	88	259	78	3401	312	254	117	78
Dog	10	59	722	102		1664		176		
Coyote		15	771	922			122			
Raccoon						1474	117		49	
Bear		15	791	98	15					
Weasel						771				
Mink						312		146	146	
Magpie						493				
Eagle		5		259		34	73			
Hawk						98	73			
Fox				49		98			44	
House Cat						141				
Owl						127				10
Badger						93				
Unknown				49		327		30	49	
TOTAL	10	118	2372	1738	93	13601	751	640	429	117

Conv. f. = 4.88

TABLE A-13

EXPANDED NUMBERS OF LIVESTOCK AND POULTRY
LOST TO PREDATOR SPECIES
DISTRICT SIX

	Cattle	Calves	Sheep	Lambs	Hogs	Chickens	Turkeys	Ducks	Geese	Guineas
Skunk						8510	310	423	80	24
Fox				20		2649	149	342	40	24
Bobcat			60	36		2014	322	12	56	8
Dog	8	16	166	68	100	1857	84	20	64	
Coyote		8	587	197		860	64	60	12	24
Badger						1491				
Mink						1150		12	80	
Weasel						587				
Hawk						302	129			
Eagle			100	161		84				
House Cat						272	8			
Magpie	8					136				
Owl						60	12			
Raccoon						68				16
Unknown		8				249	40		4	
TOTAL	16	32	913	482	100	20289	1118	869	336	96

Conv. f. = 4.02

TABLE A-14

EXPANDED NUMBERS OF LIVESTOCK AND POULTRY
LOST TO PREDATOR SPECIES
DISTRICT SEVEN

	Cattle	Calves	Sheep	Lambs	Hogs	Chickens	Turkeys	Ducks	Geese	Guineas
Bobcat		8	136	551		2617	379	88	120	64
Skunk						3304	20		60	24
Raccoon						3148	136		20	
Coyote		8	1133	678		144	40			
Eagle		8	16	1293						
Mink						838				
Dog	4	24	284			375				
Badger				20		551	56			24
Magpie						256				
Hawk						220				
Weasel						132				
House Cat						128				
Owl						52			8	
Bear			44							
Fox				28						
Unknown		8				28		16	20	
TOTAL	4	56	1613	2570		11793	631	104	228	112

Conv. f. = 3.99

TABLE A-15

LIVESTOCK AND POULTRY LOSSES TO PREDATOR SPECIES BY DISTRICT

Animal	Dist.	Cattle	Calves	Sheep	Lambs	Hogs	Chickens	Turkeys	Ducks	Geese	Guineas	Total
Skunk	1						2089		115			2204
	2						972		172	11		1155
	3						1901	51	5			1957
	4						6889	261	107	20		7277
	5						4568	54	34	24	29	4709
	6						8510	310	423	80	24	9267
	7						3304	20		60	24	3408
TOTAL							28233	696	856	195	77	29977
Bobcat	1				17		86			109	34	246
	2				23		297	183	51	217		771
	3		33	93	668		444	79	159	224		1700
	4			190	130		3203	194		63	24	3804
	5		24	88	259	78	3401	312	254	117	78	4611
	6			60	36		2014	322	12	56	8	2508
	7		8	136	551		2617	379	88	120	64	3963
TOTAL			65	567	1684	78	12062	1469	564	906	208	17603
Coyote	1		40	178	34		855	11		40		1158
	2		51	395	217		772	69				1504
	3		5	2685	1845		322	42		14		4913
	4	4	28	1315	1303		699	150	87	16		3602
	5		15	771	922			122				1830
	6		8	587	197		860	64	60	12	24	1812
	7		8	1133	678		144	40				2003
TOTAL		4	155	7064	5196		3652	498	147	82	24	16822
Dog	1	6	121	172	6		304					609
	2		6	229	46	11	784					1076
	3	9	23	453	23	65	420		23			1016
	4	16	32	205			438	32	79			802
	5	10	59	722	102		1664		176			2733
	6	8	16	166	68	100	1857	84	20	64		2383
	7	4	24	284			375					687
TOTAL		53	281	2231	245	176	5842	116	298	64		9306

TABLE A-15 CONTINUED

LIVESTOCK AND POULTRY LOSSES TO PREDATOR SPECIES BY DISTRICT

Animal	Dist.	Cattle	Calves	Sheep	Lambs	Hogs	Chickens	Turkeys	Ducks	Geese	Guineas	Total
Bear	1	17	138	6	6	126						293
	2		34	132								166
	3	103	121	1135	23	5		47				1434
	4	55	28	2690	205							2978
	5		15	791	98	15						919
	7			44								44
TOTAL		175	336	4798	332	146		47				5834
Raccoon	5						1474	117		49		1640
	6						68				16	84
	7						3148	136		20		3304
TOTAL							4690	253		69	16	5028
Fox	2						137					137
	3				14		878	135				1027
	4					63	99					162
	5				49		98			44		191
	6				20		2649	149	342	40	24	3224
	7				28							28
TOTAL					111	63	3861	284	342	84	24	4769
Eagle	1						52					52
	3				238							238
	4		12		1319							1331
	5		5		259		34	73				371
	6			100	161		84					345
	7		8	16	1293							1317
TOTAL			25	116	3270		170	73				3654
Badger	2						114	114				228
	3						42					42
	4				118		833		55			1006
	5						93					93
	6						1491					1491
	7				20		551	56			24	651
TOTAL					138		3124	170	55		24	3511

TABLE A-15 CONTINUED

LIVESTOCK AND POULTRY LOSSES TO PREDATOR SPECIES BY DISTRICT

Animal	Dist.	Cattle	Calves	Sheep	Lambs	Hogs	Chickens	Turkeys	Ducks	Geese	Guineas	Total
Mink	1						161					161
	2						172					172
	3						187		33			220
	4						186		24	8		218
	5						312		146	146		604
	6						1150		12	80		1242
	7						838					838
TOTAL							3006		215	234		3455
Weasel	1						86					86
	4						166		20			186
	5						771					771
	6						587					587
	7						132					132
TOTAL							1742		20			1762
Hawk	1						362		52			414
	3						47					47
	4						375					375
	5						98	73				171
	6						302	129				431
	7						220					220
TOTAL							1404	202	52			1658
Magpie	1						69					69
	2	6										6
	3	5					56					61
	4						107					107
	5						493					493
	6	8					136					144
	7						256					256
TOTAL		19					1117					1136

TABLE A-15 CONTINUED

LIVESTOCK AND POULTRY LOSSES TO PREDATOR SPECIES BY DISTRICT

Animal	Dist.	Cattle	Calves	Sheep	Lambs	Hogs	Chickens	Turkeys	Ducks	Geese	Guineas	Total
House Cat	1						86					86
	2						177					177
	3						196					196
	5						141					141
	6						272	8				280
	7						128					128
TOTAL							1000	8				1008
Owl	1						298				92	390
	2						63		6			69
	3						89	14		9		112
	4						79					79
	5						127				10	137
	6						60	12				72
	7						52			8		60
TOTAL							768	26	6	17	102	919
Mtn. Lion	2		6									6
	3		5									5
	4			4								4
TOTAL			11	4								15
Unk. Pred.	1		6									6
	2	6	29	11					11	29		86
	3		5		23		37		5			70
	4	4			56		76	47	8			191
	5				49		327		30	49		455
	6		8				249	40		4		301
	7		8				28		16	20		72
TOTAL		10	56	11	128		717	87	70	102		1181

TABLE A-16

NUMBER OF CASES AND AVERAGE LOSS OF LIVESTOCK BY CLASSES
IN RELATION TO PREDATOR SPECIES
STATEWIDE

Predator Responsible	Cattle		Calves		Sheep		Lambs		Swine		Total	
	No.	Mean	No.	Mean	No.	Mean	No.	Mean	No.	Mean	No.	Mean
Coyote	1	1.0	19	1.6	117	13.6	62	18.7			199	14.0
Bear	17	2.3	34	1.9	39	28.7	9	9.7	3	8.6	102	13.1
Eagle			4	1.5	3	9.6	33	24.3			40	20.1
Dog	8	1.5	27	2.1	83	5.8	11	4.7	3	13.5	132	4.8
Bobcat			6	2.3	21	6.4	47	8.2	2	8.0	76	7.2
Badger							2	17.5			2	17.5
Fox							5	5.0	1	16.0	6	6.8
Magpie	3	1.0									3	1.0
Mtn. Lion			2	1.0	1	1.0					3	1.0
Unknown Pred.	3	1.0	6	1.5	1	2.0	4	5.8			14	3.2
TOTAL - MEAN	32	1.8	98	1.9	265	12.7	173	15.0	9	11.0	577	10.9

TABLE A-17

NUMBER OF CASES AND AVERAGE LOSS OF POULTRY BY CLASSES
IN RELATION TO PREDATOR SPECIES
STATEWIDE

Predator Responsible	Chickens		Turkeys		Ducks		Geese		Guineas		Total	
	No.	Mean	No.	Mean	No.	Mean	No.	Mean	No.	Mean	No.	Mean
Skunk	381	17.2	15	11.4	16	8.6	9	5.3			421	16.4
Bobcat	137	20.6	43	7.8	13	9.2	36	5.2	3	6.0	232	15.0
Dog	49	26.3			7	9.4	5	5.2			61	22.9
Raccoon	44	25.2	5	11.7			3	5.0	2	4.0	54	22.0
Fox	56	16.4	8	8.2	4	21.2	4	4.8	1	4.0	73	14.9
Coyote	57	13.7	12	9.4	3	12.3	6	2.8			78	12.1
Badger	44	18.2	3	11.3	1	14.0	1	5.0			49	16.6
Mink	37	19.0			7	6.6	5	10.4			49	16.4
Weasel	22	17.9			1	5.0					23	17.3
Hawk	31	10.3	2	23.5	1	9.0					34	11.0
Magpie	11	23.9									11	23.9
Unknown Pred.	9	18.2	2	11.0	7	2.3	5	4.2			23	10.0
House Cat	18	12.1	2	6.0							20	11.4
Owl	16	9.7	2	3.0	1	1.0	2	2.0	2	9.0	23	8.0
Eagle	3	9.3	1	15.0							4	17.3
Bear			1	10.0							1	10.0
TOTAL-MEAN	916	18.0	96	9.6	61	8.8	76	5.0	8	6.0	1157	15.9

TABLE A-18

TYPE AND EXTENT OF FUR ANIMAL DAMAGE
MAIL SURVEY
DISTRICT 1

Fur Animal Responsible	Extent of Damage	Property Reported Damaged: Irrig.	Land Flooding	Tree Cutting	Reser-voir	Field Flooding	Stream-bank	Unk.	Crop Damage	Grain	Total No.	Total %
Beaver	Light	7	6	13	1	3	6	2	1		39	43
	Medium	2	10	5		3	1	2	1		24	27
	Heavy	1	4	4		4	2				15	17
	Unknown	3	3		1	1	3			1	12	13
	Total	13	23	22	2	11	12	4	2	1	90	69
Muskrat	Light	5			6	1		1	1	1	15	40
	Medium	6			2			1			9	24
	Heavy	5			3						8	22
	Unknown	3			2						5	14
	Total	19			13	1		2	1	1	37	28
Beaver & Muskrat	Light					1		1			2	50
	Heavy						1				1	25
	Unknown				1						1	25
	Total				1		1				2	2
GRAND TOTAL		32	23	22	16	13	13	7	3	2	131	
PERCENT OF TOTAL		24	17	17	12	10	10	5	2	2		

TABLE A-19

TYPE AND EXTENT OF FUR ANIMAL DAMAGE
MAIL SURVEY
DISTRICT 2

Fur Animal Responsible	Extent of Damage	Property Reported Damaged: Irrig.	Land Flooding	Tree Cutting	Stream-bank	Field Flooding	Fence	Reser-voir	Crop Damage	Total No.	Total %
Beaver	Light	15	13	3	1	1	3			36	24
	Medium	21	18	8	5		1	2		55	37
	Heavy	16	8	4	4	2				34	23
	Unknown	8	6	4		3	1			22	15
	Total	60	45	19	10	6	5	2		147	84
Muskrat	Light	5	2						3	10	45
	Medium	3	2				1	1		7	32
	Heavy	2				1				3	14
	Unknown	1						1		2	9
	Total	11	4			1	1	2	3	22	12
Beaver & Muskrat	Light	2				1				3	50
	Medium	1								1	17
	Heavy	1								1	17
	Unknown	1								1	17
	Total	5				1				6	3
GRAND TOTAL		76	49	19	10	8	6	4	3	175	
PERCENT OF TOTAL		43	28	11	6	4	3	2	1		

TABLE A-20

TYPE AND EXTENT OF FUR ANIMAL DAMAGE
MAIL SURVEY
DISTRICT 3

Fur Animal Responsible	Extent of Damage	Property Reported Damaged									Total	
		Irrig.	Land Flooding	Tree Cutting	Field Flooding	Unk.	Stream-bank	Reser-voir	Live-stock	Crop Damage	No.	%
Beaver	Light	30	17	15	3	3	2		1	1	72	27
	Medium	39	19	23	10	2	5	1	1		100	37
	Heavy	28	20	7	6	4	2		2		69	26
	Unknown	12	4	3	2	3	1		1		26	10
	Total	109	60	48	21	12	10	1	5	1	267	84
Muskrat	Light	10		2				1		1	14	41
	Medium	7	1	3			1	2			14	41
	Heavy	2					1				3	9
	Unknown	2						1			3	9
	Total	21	1	5			2	4		1	34	11
Beaver & Muskrat	Light	2				1					3	20
	Medium	8									8	53
	Heavy	2				1					3	20
	Unknown	1									1	7
	Total	13				2					15	5
GRAND TOTAL		143	61	53	21	14	12	5	5	2	316	
PERCENT OF TOTAL		45	19	17	7	4	4	2	2	1		

TABLE A-21

TYPE AND EXTENT OF FUR ANIMAL DAMAGE
MAIL SURVEY
DISTRICT 4

Fur Animal Responsible	Extent of Damage	Property Reported Damaged: Tree Cutting	Land Flooding	Irrig.	Reser-voir	Field Flooding	Unk.	Stream-bank	Live-stock	Fence	Crop Damage	Total No.	Total %
Beaver	Light	26	19	6	7	10	6	3	3	4	2	86	23
	Medium	41	27	18		15	6		3		1	111	30
	Heavy	42	36	28	2	17	2	3	3			133	35
	Unknown	17	8	6	3	10		2				46	12
	Total	126	90	58	12	52	14	8	9	4	3	376	84
Muskrat	Light	1		4	19							24	38
	Medium	2	1	5	8							16	25
	Heavy	4		1	8							13	20
	Unknown	2	1	2	4		2					11	17
	Total	9	2	12	39		2					64	14
Beaver & Muskrat	Light			2								2	29
	Medium			2								2	29
	Unknown			1	1		1					3	43
	Total			5	1		1					7	2
GRAND TOTAL		135	92	75	52	52	17	8	9	4	3	447	
PERCENT OF TOTAL		30	21	17	12	12	4	2	2	1	1		

TABLE A-22

TYPE AND EXTENT OF FUR ANIMAL DAMAGE
MAIL SURVEY
DISTRICT 5

Fur Animal Responsible	Extent of Damage	Property Reported Damaged: Irrig.	Tree Cutting	Land Flooding	Crop Damage	Reser-voir	Stream-bank	Field Flooding	Unk.	Live-stock	Fence	Grain	Total No.	Total %
Beaver	Light	20	23	14	1	1	5	1	2	1			68	29
	Medium	14	28	19	3		1	5			3		73	31
	Heavy	17	17	21	2	2	2		1				62	26
	Unknown	12	6	7	1				2	3			31	13
	Total	63	74	61	7	3	8	6	5	4	3		234	81
Muskrat	Light	10	1	3		5			1			1	21	55
	Medium	7				2							9	24
	Heavy	3	1			1							5	13
	Unknown	2				1							3	8
	Total	22	2	3		9			1			1	38	13
Beaver & Muskrat	Light	1											1	11
	Medium	3											3	33
	Heavy	3											3	33
	Unknown	1		1									2	22
	Total	8		1									9	3
Raccoon	Heavy				3								3	43
	Unknown				4								4	57
	Total				7								7	2
GRAND TOTAL		93	76	65	14	12	8	6	6	4	3	1	288	
PERCENT OF TOTAL		32	26	23	5	4	3	2	2	1	1			

TABLE A-24

TYPE AND EXTENT OF FUR ANIMAL DAMAGE
MAIL SURVEY
DISTRICT 6

Fur Animal Responsible	Extent of Damage	Property Reported Damaged: Tree Cutting	Reser-voir	Irrig.	Land Flooding	Field Flooding	Grain	Unk.	Crop Damage	Live-stock	Stream-bank	Total No.	Total %
Beaver	Light	28	6	11	11	4	3	1				64	32
	Medium	34	1	10	9	2		2	1	1		60	30
	Heavy	31	2	8	2	2				1	1	47	24
	Unknown	14		8	2	3						27	14
	Total	107	9	37	24	11	3	3	1	2	1	198	74
Muskrat	Light		20	1	1							22	35
	Medium	2	10		1	1						14	22
	Heavy		15	1								16	25
	Unknown		11									11	17
	Total	2	56	2	2	1						63	24
Beaver & Muskrat	Medium		2	2								2	1
Raccoon	Light								1			1	25
	Medium			2								2	50
	Unknown								1			1	25
	Total			2					2			4	1
GRAND TOTAL		109	65	43	26	12	3	3	3	2	1	267	
PERCENT OF TOTAL		41	24	16	10	4	1	1	1	1			

TABLE A-25

TYPE AND EXTENT OF FUR ANIMAL DAMAGE
MAIL SURVEY
DISTRICT 7

Fur Animal Responsible	Extent of Damage	Property Reported Damaged: Tree Cutting	Irrig.	Land Flooding	Crop Damage	Reservoir	Streambank	Unk.	Field Flooding	Livestock	Fence	Total No.	Total %
Beaver	Light	24	3	5	1	2		4	1			40	19
	Medium	47	20	14			1	1	1		1	85	41
	Heavy	41	9	4	1	3	5	1				64	31
	Unknown	15	1	2						1		19	9
	Total	127	33	25	2	5	6	6	2	1	1	208	84
Raccoon	Light		1		1							2	8
	Medium				4							4	17
	Heavy			1	7							8	33
	Unknown		1		9							10	42
	Total		2	1	21							24	10
Muskrat	Light					6						6	43
	Medium		1			3						4	28
	Heavy						1					1	7
	Unknown					3						3	21
	Total		1			12	1					14	6
Beaver & Muskrat	Medium		1			1						2	1
GRAND TOTAL		127	37	26	23	18	7	6	2	1	1	248	
PERCENT OF TOTAL		51	15	10	9	7	3	2	1				

TABLE A-26

TYPE OF BIG GAME DAMAGE
DISTRICT ONE

Animal Responsible	Manner Damaged	Crop or Property Reported Damaged by Farm and Ranch Operators										
		Grain	Alfalfa Hay	Haystack	Garden	Tree	Range	Corn	Fence	Beets	Total
Deer	Grazing	27	25	29		23	2	8	3			117
	Feeding	1		3	19		24					47
	Trampling	11		2					3			16
	Gr. & Tramp.	4	1									5
	TOTAL	43	26	34	19	23	26	8	3	3		185
	PERCENT OF TOTAL	23	14	18	10	12	14	4	2	2		82
Elk	Grazing			1								1
	Feeding			2	1							3
	Trampling								7			7
	Gr. & Tramp.	1										1
	TOTAL	1		3	1				7			12
	PERCENT OF TOTAL	8		25	8				58			5
Deer & Elk	Grazing	4	6	4			2					16
	Feeding				5		2					7
	Trampling	1				1			3			5
	Gr. & Tramp.						1					1
	TOTAL	5	6	4	5	1	2	3	3			29
	PERCENT OF TOTAL	17	20	14	17	3	7	10	10			13
GRAND TOTAL		49	32	41	25	24	28	11	3	13		226
PERCENT OF TOTAL		21	14	18	11	11	12	5	1	6		

TABLE A-27

TYPE OF BIG GAME DAMAGE
DISTRICT TWO

Animal Responsible	Manner Damaged	Crop or Property Damaged									
		Grain	Alfalfa	Hay	Haystack	Garden	Tree	Range	Corn	Fence	Beets	Total
Deer	Grazing	13	10	15		3		2			1	44
	Feeding				11							11
	Trampling	3		4	1					1		9
	Gr. & Tramp.	1										1
	TOTAL	17	10	19	12	3		2		1	1	65
	PERCENT OF TOTAL	26	15	29	18	5		3		2	2	51
Elk	Grazing	1	1	3				5				10
	Feeding				14							14
	Trampling	1		1						6		8
	TOTAL	2	1	4	14			5		6		32
	PERCENT OF TOTAL	6	3	12	44			16		19		25
Deer and Elk	Grazing	5	5	4				5				19
	Feeding				6							6
	Trampling		1							1		2
	Gr. & Tramp.	1		1								2
	TOTAL	6	6	5	6			5		1		29
	PERCENT OF TOTAL	21	21	17	21			17		3		23
Moose	Trampling									1		1
	TOTAL									1		1
GRAND TOTAL		25	17	28	32	3		12		9	1	127
PERCENT OF TOTAL		20	13	22	25	3		9		7	1	

TABLE A-28

TYPE OF BIG GAME DAMAGE
DISTRICT THREE

Animal Responsible	Manner Damaged	Crop or Property Reported Damaged by Farm & Ranch Operators									
		Grain	Alfalfa Hay	Haystack	Garden	Tree	Range	Corn	Fence	Beets	Total
Deer	Grazing	17	16	42		2	17	1			95
	Feeding	1	1	6	57						65
	Trampling	14	4	3	3				4		28
	Gr. & Tramp.	2	3	1							6
	TOTAL	34	24	52	60	2	17	1	4		194
	PERCENT OF TOTAL	18	12	27	31	1	9	1	2		56
Antelope	Grazing	16	5	17			17				55
	Feeding				1						1
	Trampling	16	1	3	1		1		5		27
	Gr. & Tramp.	6									6
	TOTAL	38	6	20	2		18		5		89
	PERCENT OF TOTAL	43	7	22	2		20		7		26
Elk	Grazing		1	1		1	2				5
	Feeding			1	11						12
	Trampling				1				5		6
	TOTAL		1	2	12	1	2		5		23
	PERCENT OF TOTAL		4	9	52	4	9		22		7
Deer and Antelope	Grazing	7	1	1			3				12
	Trampling	3	1				1		1		6
	Gr. & Tramp.	1			1						2
	TOTAL	11	2	1	1		4		1		20
	PERCENT OF TOTAL	55	10	5	5		20		5		6
Moose	Feeding				8						8
	Trampling			1					1		2
	TOTAL			1	8				1		10
	PERCENT OF TOTAL			10	80				10		3
Deer and Elk	Grazing			2			3				5
	Feeding				2						2
	Trampling								1		1
	TOTAL			2	2		3		1		8
	PERCENT OF TOTAL			25	25		38		12		2
GRAND TOTAL		83	33	78	85	3	44	1	17		344
PERCENT OF TOTAL		24	10	23	25	1	13	0	5		

TABLE A-29

TYPE OF BIG GAME DAMAGE
DISTRICT FOUR

Animal Responsible	Manner Damaged	Crop or Property Damaged										
		Grain	Alfalfa	Hay	Haystack	Garden	Tree	Range	Corn	Fence	Beets	Total
Deer	Grazing	93	57	40		15	1	12	1			219
	Feeding	6	11	1	113		3					134
	Trampling	39	4	5	2					2		52
	Gr. & Tramp.	23	4									27
	TOTAL	161	76	46	115	15	4	12	1	2		432
	PERCENT OF TOTAL	37	18	11	27	3	1	3	0	0		60
Antelope	Grazing	41	8	8				12				69
	Feeding		5		3							8
	Trampling	74	1					1		9	1	86
	Gr. & Tramp.	13	1									14
	TOTAL	128	15	8	3			13		9	1	177
	PERCENT OF TOTAL	72	8	5	2			7		5	1	25
Elk	Grazing	2	1			2		5				10
	Feeding			1	2							3
	Trampling	1								5		6
	TOTAL	3	1	1	2	2		5		5		19
	PERCENT OF TOTAL	16	5	5	11	11		26		26		3
Deer and Antelope	Grazing	21	4	1		1		5				32
	Feeding		4		1							5
	Trampling	12	2	1				1		3		19
	Gr. & Tramp.	7										7
	TOTAL	40	10	2	1	1		6		3		63
	PERCENT OF TOTAL	63	16	3	2	2		10		5		9
Deer and Elk	Grazing	2	3	4				4				13
	Feeding			1	7							8
	Trampling									2		2
	TOTAL	2	3	5	7			4		2		23
	PERCENT OF TOTAL	9	13	22	30			17		9		3
GRAND TOTAL		334	105	62	128	18	4	40	1	21	1	714
PERCENT OF TOTAL		47	15	9	18	3	1	6	0	3	0	

TABLE A-30

TYPE OF BIG GAME DAMAGE
DISTRICT FIVE

Animal Responsible	Manner Damaged	Crop or Property Damaged										
		Grain	Alfalfa	Hay	Haystack	Garden	Tree	Range	Corn	Fence	Beets	Total
Deer	Grazing	31	29	30		4		4	6		5	109
	Feeding		30	1	56		3					90
	Trampling	4	1	3	2					1		11
	Gr. & Tramp.	5	3									8
	TOTAL	40	63	34	58	4	3	4	6	1	5	218
	PERCENT OF TOTAL	18	29	16	27	2	1	2	3	0	2	60
Antelope	Grazing	20	6	3				18	1			48
	Feeding	1	7									8
	Trampling	32	1	1						9		43
	Gr. & Tramp.	6										6
	TOTAL	59	14	4				18	1	9		105
	PERCENT OF TOTAL	56	13	4				17	1	8		29
Elk	Grazing			1								1
	Feeding	1		1	3							5
	Trampling									1		1
	TOTAL	1		2	3					1		7
	PERCENT OF TOTAL	14		28	43					14		2
Deer and Antelope	Grazing	4	4	4				5	1			18
	Feeding		5		4							9
	Trampling	4								1		5
	TOTAL	8	9	4	4			5	1	1		32
	PERCENT OF TOTAL	25	28	12	12			16	3	3		9
Deer and Elk	Grazing	1										1
	Feeding		1		1							2
	TOTAL	1	1		1							3
	PERCENT OF TOTAL	33	33		33							1
GRAND TOTAL		109	87	44	66	4	3	27	8	12	5	365
PERCENT OF TOTAL		30	24	12	18	1	1	7	2	3	1	

TYPE OF BIG GAME DAMAGE
DISTRICT SIX

Animal Responsible	Manner Damaged	Crop or Property Damaged										
		Grain	Alfalfa	Hay	Haystack	Garden	Tree	Range	Corn	Fence	Beets	Total
Deer	Grazing	73	46	13		21	2	3	21		3	182
	Feeding	2	9	2	46		1		3			63
	Trampling	36	1			1				2		40
	Gr. & Tramp.	17	2						1			20
	TOTAL	128	58	15	46	22	3	3	25	2	3	305
	PERCENT OF TOTAL	42	19	5	15	7	1	1	8	1	1	47
Antelope	Grazing	72	21	2		3		9	14			121
	Feeding	3	5						2			10
	Trampling	111	1		1				1	3		117
	Gr. & Tramp.	26	1			1		1				29
	TOTAL	212	28	2	1	4		10	17	3		277
	PERCENT OF TOTAL	76	10	1	0	1		4	6	1		43
Elk	Grazing								1			1
	Trampling	1								2		3
	TOTAL	1							1	2		4
	PERCENT OF TOTAL	25							25	50		1
Deer and Antelope	Grazing	20	4			3		1	2			30
	Feeding	1	6						1			8
	Trampling	6										6
	Gr. & Tramp.	9	1									10
	TOTAL	36	11			3		1	3			54
	PERCENT OF TOTAL	67	20			6		2	6			8
Deer and Elk	Grazing	2										2
	Feeding	1		1								2
	Gr. & Tramp.	2										2
	TOTAL	5		1								6
	PERCENT OF TOTAL	83		17								1
GRAND TOTAL		382	97	18	47	29	3	14	46	7	3	646
PERCENT OF TOTAL		59	15	3	7	4	0	2	7	1	0	

TABLE A-32

TYPE OF BIG GAME DAMAGE
DISTRICT SEVEN

Animal Responsible	Manner Damaged	Crop or Property Damaged										
		Grain	Alfalfa	Hay	Haystack	Garden	Tree	Range	Corn	Fence	Beets	Total
Deer	Grazing	39	51	9		11		8	45		5	168
	Feeding	2	99	5	63		3		9		1	182
	Trampling	6	2		2					3	1	14
	Gr. & Tramp.	12	2								1	15
	TOTAL	59	154	14	65	11	3	8	54	3	8	379
	PERCENT OF TOTAL	16	41	4	17	3	1	2	14	0	2	52
Antelope	Grazing	72	21	1	1			23	13			131
	Feeding	3	15	1	2				1			22
	Trampling	45	2	1						6		54
	Gr. & Tramp.	13	2			1		1	1			18
	TOTAL	133	40	3	3	1		24	15	6		225
	PERCENT OF TOTAL	59	18	1	1	1		11	6	3		31
Elk	Grazing	1										1
	Trampling	1								1		2
	TOTAL	2								1		3
	PERCENT OF TOTAL	67								33		0
Deer and Antelope	Grazing	34	15	4		1		6	19			79
	Feeding	1	20	2	4							27
	Trampling	4	1									5
	Gr. & Tramp.	4							1			5
	TOTAL	43	36	6	4	1		6	20			116
	PERCENT OF TOTAL	37	31	5	3	1		5	17			16
Deer and Elk	Feeding	1	1									2
	TOTAL	1	1									2
	PERCENT OF TOTAL	50	50									0
GRAND TOTAL		238	231	23	72	13	3	38	89	10	8	725
PERCENT OF TOTAL		33	32	3	10	2	0	5	12	1	1	

TABLE A-33

EXTENT OF BIG GAME DAMAGE
DISTRICT ONE

Animal Responsible	Extent of Damaged Reported	Grain No.	Grain %	Alfalfa No.	Alfalfa %	Hay No.	Hay %	Haystack No.	Haystack %	Garden No.	Garden %	Tree No.	Tree %	Range No.	Range %	Corn No.	Corn %	Fence No.	Fence %	Total No.	Total %
Deer	Light	19	46	9	36	17	53	6	35	9	43	5	20	3	38	1				69	40
	Medium	15	36	10	40	13	41	8	47	3	14	9	36	3	38	2		1		64	37
	Heavy	7	17	6	24	2	6	3	18	9	43	11	44	2	25					40	23
	TOTAL	41		25		32		17		21		25		8		3		1		173	
Elk	Light							1										2		3	33
	Medium	1																3		4	44
	Heavy					2														2	22
	TOTAL	1				2		1										5		9	
Deer and Elk	Light	2		3				4				1		1				1		12	44
	Medium	3		3		2		1		1				1				1		12	44
	Heavy					1						1						1		3	11
	TOTAL	5		6		3		5		1		2		2				3		27	
GRAND TOTAL	Light	21	45	12	39	17	46	11	48	9	41	6	22	4	40	1	33	3	33	84	40
	Medium	19	40	13	42	15	40	9	39	4	18	9	33	4	40	2	67	5	56	80	38
	Heavy	7	15	6	19	5	14	3	13	9	41	12	44	2	20			1	11	45	22
	TOTAL	47		31		37		23		22		27		10		3		9		209	

TABLE A-34

EXTENT OF BIG GAME DAMAGE
DISTRICT TWO

Animal Responsible	Extent of Damaged Reported	Grain No.	Grain %	Alfalfa No.	Alfalfa %	Hay No.	Hay %	Haystack No.	Haystack %	Garden No.	Garden %	Range No.	Range %	Fence No.	Fence %	Beets No.	Beets %	Total No.	Total %
Deer	Light	14	88	4	44	12	63	4	44	..		1						35	59
	Medium	2	12	5	56	3	16	5	56	1		1				2		19	32
	Heavy					4	21			1								5	8
	TOTAL	16		9		19		9		2		2				2		59	
Elk	Light	1		1		2		6	43			1						11	37
	Medium					2		4	28			3		4				13	43
	Heavy	1						4	28					1				6	20
	TOTAL	2		1		4		14				4		5				30	
Deer and Elk	Light	3		3	50	3	50	2	33			1	25	1				13	45
	Medium	3		2	33	2	33	1	17			2	50					10	34
	Heavy			1	17	1	17	3	50			1	25					6	21
	TOTAL	6		6		6		6				4		1				29	
Moose	Light													1				1	
	TOTAL													1				1	
GRAND TOTAL	Light	18	75	8	50	17	59	12	41			3	30	2	29			60	50
	Medium	5	21	7	44	7	24	10	34	1		6	60	4	57	2		42	35
	Heavy	1	4	1	6	5	17	7	24	1		1	10	1	14			17	14
	TOTAL	24		16		29		29		2		10		7		2		119	

TABLE A-35

EXTENT OF BIG GAME DAMAGE
DISTRICT THREE

Animal Responsible	Extent of Damage Reported	Grain No.	Grain %	Alfalfa No.	Alfalfa %	Hay No.	Hay %	Haystack No.	Haystack %	Garden No.	Garden %	Range No.	Range %	Corn No.	Corn %	Fence No.	Fence %	Total No.	Total %
Deer	Light	23	68	8	33	23	47	28	48	1		4	24			2		89	47
	Medium	8	24	9	38	23	47	22	38			7	41	1		2		72	38
	Heavy	3	9	7	29	3	6	8	14	1		6	35					28	15
	TOTAL	34		24		49		58		2		17		1		4		189	
Antelope	Light	28	74	3	43	7	37	1				4	27			1		44	52
	Medium	8	21	2	28	8	42					7	47			4		29	34
	Heavy	2	5	2	28	4	21					4	27					12	14
	TOTAL	38		7		19		1				15				5		85	
Elk	Light							5	42			1				2	50	9	41
	Medium					1		5	42							1	25	7	32
	Heavy					1		2	17	1		1				1	25	6	27
	TOTAL			1		2		12		1		2				4		22	
Deer and Antelope	Light	8		2				1										11	61
	Medium	3				1						2				1		7	39
	TOTAL	11		2		1		1				2				1		18	
Deer and Elk	Light					1						1						2	25
	Medium							2										2	25
	Heavy					1						2				1		4	50
	TOTAL					2		2				3				1		8	
Moose	Light					1		2										3	30
	Medium							3								1		4	40
	Heavy							3										3	30
	TOTAL					1		8								1		10	
GRAND TOTAL	Light	59	71	14	41	32	43	37	45	1		10	26			5	31	158	48
	Medium	19	23	11	32	33	44	32	39			16	41	1		9	56	121	36
	Heavy	5	6	9	26	9	12	13	16	2		13	33			2	12	53	16
	TOTAL	83		34		74		82		3		39		1		16		332	

TABLE A-36

EXTENT OF BIG GAME DAMAGE
DISTRICT FOUR

Animal Responsible	Extent of Damage Reported	Grain		Alfalfa		Hay		Haystack		Garden		Tree		Range		Corn		Fence		Beets		Total	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Deer	Light	93	62	35	47	23	51	18	24	1	7	1	25	5	42			1				177	47
	Medium	39	26	21	28	10	22	38	51	2	14	1	25	4	33	1		1				117	31
	Heavy	18	12	18	24	12	27	18	24	11	78	2	50	3	25							82	22
	TOTAL	150		74		45		74		14		4		12		1		2				376	
Antelope	Light	84	66	5	33	4	50							8	62			2	22			103	58
	Medium	31	24	6	40	3	38	1						4	31			4	44			49	28
	Heavy	13	10	4	27	1	12	2						1	8			3	33	1		25	14
	TOTAL	128		15		8		3						13				9		1		177	
Elk	Light	2		1				1		1				2	28			2				9	45
	Medium													4	57			2				6	30
	Heavy	1				1		1		1				1	14							5	25
	TOTAL	3		1		1		2		2				7				4				20	
Deer and Antelope	Light	28	70	3	27	2								3				1				37	60
	Medium	8	20	5	45			1		1				2								17	27
	Heavy	4	10	3	27	1																8	13
	TOTAL	40		11		3		1		1				5				1				62	
Deer and Elk	Light	1		1				1	17					1								4	19
	Medium			1		1		1	17									1				4	19
	Heavy	1		1		4		4	67					3								13	62
	TOTAL	2		3		5		6						4				1				21	
GRAND TOTAL	Light	208	64	45	43	29	47	20	23	2	12	1	25	19	46			6	35			330	50
	Medium	78	24	33	32	14	22	41	48	3	18	1	25	14	34	1		8	47			193	29
	Heavy	37	11	26	25	19	31	25	29	12	70	2	50	8	20			3	18	1		133	20
	TOTAL	323		104		62		86		17		4		41		1		17		1		656	

TABLE A-37

EXTENT OF BIG GAME DAMAGE
DISTRICT FIVE

Animal Responsible	Extent of Damage Reported	Grain		Alfalfa		Hay		Haystack		Garden		Tree		Range		Corn		Fence		Beets		Total	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Deer	Light	27	68	20	32	18	53	27	46			1	33	2	50	3	50			5		103	48
	Medium	11	28	28	45	13	38	26	45	2		1	33	1	25	1	17					83	38
	Heavy	2	5	14	22	3	9	5	9	2		1	33	1	25	2	33					30	14
	TOTAL	40		62		34		58		4		3		4		6				5		216	
Antelope	Light	61	70	5	36	2								10				3				81	62
	Medium	21	24	6	43	2								5		1		5				40	31
	Heavy	5	6	3	21													1				9	7
	TOTAL	87		14		4								15		1		9				130	
Elk	Light							1														1	17
	Medium	1				1		2										1				5	83
	TOTAL	1				1		3										1				6	
Deer and Antelope	Light	5		3		3		4						2								17	53
	Medium	4		1										2								7	22
	Heavy			5		1								1				1				8	25
	TOTAL	9		9		4		4						5				1				32	
Deer and Elk	Medium	1		1				1														3	
	TOTAL	1		1				1														3	
GRAND TOTAL	Light	93	67	28	32	23	53	32	48			1	33	14	58	3	43	3	27	5		202	52
	Medium	38	28	36	42	16	37	29	43	2		1	33	8	33	2	28	6	54			138	36
	Heavy	7	5	22	26	4	9	5	8	2		1	33	2	8	2	28	2	18			47	12
	TOTAL	138		86		43		66		4		3		24		7		11		5		387	

TABLE A-38

EXTENT OF BIG GAME DAMAGE
DISTRICT SIX

Animal Responsible	Extent of Damage Reported	Grain No.	Grain %	Alfalfa No.	Alfalfa %	Hay No.	Hay %	Haystack No.	Haystack %	Garden No.	Garden %	Tree No.	Tree %	Range No.	Range %	Corn No.	Corn %	Fence No.	Fence %	Beets No.	Beets %	Total No.	Total %
Deer	Light	93	73	24	44	7	54	17	41	4	21			1		11	46			2		159	56
	Medium	27	21	22	40	5	38	19	46	4	21			2		8	33					87	30
	Heavy	7	6	9	16	1	8	5	12	11	58	1				5	21			1		40	14
	TOTAL	127		55		13		41		19		1		3		24				3		286	
Antelope	Light	122	60	11	41					2	50			4		4	25	2				145	54
	Medium	68	33	10	37	1		1		1	25			5		6	38	1				93	35
	Heavy	15	7	6	22	1				1	25					6	38					29	11
	TOTAL	205		27		2		1		4				9		16		3				267	
Elk	Light																	1				1	33
	Heavy	1														1						2	67
	TOTAL	1														1		1				3	
Deer and Antelope	Light	29	83	1	10					1						1						32	64
	Medium	5	14	7	70									1								13	26
	Heavy	1	3	2	20					2												5	10
	TOTAL	35		10						3				1		1						50	
Deer and Elk	Light					1																1	20
	Medium	2																				2	40
	Heavy	2																				2	40
	TOTAL	4				1																5	
GRAND TOTAL	Light	244	66	36	39	8	50	17	40	7	27			5	38	16	38	3		2		338	55
	Medium	102	27	39	42	6	38	20	48	5	19			8	62	14	33	1				195	32
	Heavy	26	7	17	18	2	12	5	12	14	54	1				12	29			1		78	13
	TOTAL	372		92		16		42		26		1		13		42		4		3		611	

TABLE A-39

EXTENT OF BIG GAME DAMAGE
DISTRICT SEVEN

Animal Responsible	Extent of Damage Reported	Grain		Alfalfa		Hay		Haystack		Garden		Tree		Range		Corn		Fence		Beets		Total	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Deer	Light	30	54	37	24	5	36	22	34	4	36	1		5	62	20	38	2		7		133	36
	Medium	22	39	58	38	4	28	25	39					1	12	19	36	1				130	35
	Heavy	4	7	56	37	5	36	17	26	7	64	2		2	25	14	26					107	29
	TOTAL	56		151		14		64		11		3		8		53		3		7		370	
Antelope	Light	72	55	15	38	2		1						10	48	4	27	3				107	50
	Medium	42	32	15	38	1		1		1				8	38	4	27	2				74	34
	Heavy	16	12	9	23									3	14	7	47					35	16
	TOTAL	130		39		3		2		1				21		15		5				216	
Elk	Light	2																				2	
	Heavy																	1				1	
	TOTAL	2																1				3	
Deer and Antelope	Light	19	46	13	36	1	17	1	25					2		5	25					41	36
	Medium	14	34	12	33	4	67	2	50					4		8	40					44	38
	Heavy	8	20	11	30	1	17	1	25	1						7	35					29	25
	TOTAL	41		36		6		4		1				6		20						114	
Deer and Elk	Medium	1																				1	
	Heavy			1																		1	
	TOTAL	1		1																		2	
GRAND TOTAL	Light	123	53	65	29	8	35	24	34	4	31	1		17	48	29	33	5	56	7		283	40
	Medium	79	34	85	37	9	39	28	40	1	8			13	37	31	35	3	33			249	35
	Heavy	28	12	77	34	6	26	18	26	8	62	2		5	14	28	32	1	11			173	24
	TOTAL	230		227		23		70		13		3		35		88		9		7		705	

TABLE A-40

TYPE OF GAME BIRD DAMAGE
DISTRICT ONE

Bird Responsible	Type of Damage	Crop Reported Damaged									
		Wheat	Barley	Oats	Grain	Swathed Grain	Potatoes	Beets	Garden	Hay	Total
Pheasant	Feeding	12		2	23			1	11		29
	Trampling		1		1						2
	Soiling									1	1
	TOTAL	12	1	2	24			1	11	1	52
	PERCENT OF TOTAL	23	2	4	46			2	21	2	60
Grouse	Feeding								2		2
	TOTAL								2		2
	PERCENT OF TOTAL										2
Ducks	Feeding	5	2	1	14						22
	Trampling	1									1
	Soiling	1									1
	TOTAL	7	2	1	14						24
	PERCENT OF TOTAL	29	8	4	58						28
Geese	Feeding	6		1	1					1	9
	TOTAL	6		1	1					1	9
	PERCENT OF TOTAL	67		11	11					11	10
GRAND TOTAL	Feeding	23	2	4	38			1	13	1	82
	Trampling	1	1		1						3
	Soiling	1								1	2
	TOTAL	25	3	4	39			1	13	2	87
	PERCENT OF TOTAL	29	3	4	45			1	15	2	

EXTENT OF REPORTED DAMAGE		LIGHT	MEDIUM	HEAVY	TOTAL
	Number	52	21	7	80
	Percent	65	26	9	

TABLE A-41

TYPE OF GAME BIRD DAMAGE
DISTRICT TWO

Bird Responsible	Type of Damage	Crop Reported Damaged									
		Wheat	Barley	Oats	Swathed Grain	Grain	Potatoes	Beets	Garden	Hay	Total
Pheasant	Feeding				5		2		4		11
	Trampling				1						1
	Soiling	1									1
	TOTAL	1			6		2		4		13
	PERCENT OF TOTAL	8			46		15		31		81
Ducks	Feeding				1	1					2
	Trampling									1	1
	TOTAL				1	1				1	3
	PERCENT OF TOTAL				33	33				33	19
GRAND TOTAL	Feeding				6	1	2		4		13
	Trampling				1					1	2
	Soiling	1									1
	TOTAL	1			7	1	2		4	1	16
	PERCENT OF TOTAL	6			44	6	12		25	6	

EXTENT OF REPORTED DAMAGE		LIGHT	MEDIUM	HEAVY	TOTAL
	Number	9	3	3	15
	Percent	60	20	20	

TABLE A-42

TYPE OF GAME BIRD DAMAGE
DISTRICT THREE

Bird Responsible	Manner Damage	Crop Reported Damaged: Wheat	Barley	Oats	Grain	Swathed Grain	Potatoes	Beets	Garden	Hay	Total
Pheasant	Feeding	4	2	1	3				2		12
	Trampling	1			1					1	3
	TOTAL	5	2	1	4				2	1	15
	PERCENT OF TOTAL	33	13	7	27				13	7	58
Grouse	Feeding	1									1
	TOTAL	1									1
	PERCENT OF TOTAL										4
Ducks	Feeding		3		2						5
	TOTAL		3		2						5
	PERCENT OF TOTAL		60		40						19
Geese	Feeding	1		1	2	1					5
	TOTAL	1		1	2	1					5
	PERCENT OF TOTAL	20		20	40	20					19
GRAND TOTAL	Feeding	6	5	2	7	1			2		23
	Trampling	1			1					1	3
	TOTAL	7	5	2	8	1			2	1	26
	PERCENT OF TOTAL	27	19	8	31	4			8	4	

EXTENT OF REPORTED DAMAGE		LIGHT	MEDIUM	HEAVY	TOTAL
	Number	19	5	2	26
	Percent	73	19	8	

TABLE A-43

TYPE OF GAME BIRD DAMAGE
DISTRICT FOUR

Bird Responsible	Manner Damaged	Crop Reported Damaged: Wheat	Barley	Oats	Grain	Swathed Grain	Potatoes	Beets	Garden	Hay	Total
Pheasant	Feeding	9	6	3	29	4	9		12		72
	Trampling	3			4					1	8
	TOTAL	12	6	3	33	4	9		12	1	80
	PERCENT OF TOTAL	15	8	4	41	5	11		15	1	
Grouse	Feeding	1									1
	Trampling	2									2
	TOTAL	3									3
Ducks	Feeding	12	7	3	8	17				1	48
	Trampling		2			1					3
	TOTAL	12	9	3	8	18				1	51
	PERCENT OF TOTAL	24	18	6	16	36				2	
Geese	Feeding	2		1	1	1					5
	TOTAL	2		1	1	1					5
	PERCENT OF TOTAL	40		20	20	20					
Hungarian	Feeding	1							3		4
	TOTAL	1							3		4
GRAND TOTAL	Feeding	25	13	7	38	22	9		15	1	130
	Trampling	5	2		4	1				1	13
	TOTAL	30	15	7	42	23	9		15	2	143
	PERCENT OF TOTAL	21	10	5	29	16	6		10	1	

EXTENT OF REPORTED DAMAGE		LIGHT	MEDIUM	HEAVY	TOTAL
	Number	85	29	25	139
	Percent	61	21	18	

TABLE A-44

TYPE OF GAME BIRD DAMAGE
DISTRICT FIVE

Bird Responsible	Manner Damaged	Crop Reported Damaged									
		Wheat	Barley	Oats	Grain	Swathed Grain	Potatoes	Beets	Garden	Hay	Total
Pheasant	Feeding	6	1		23		1	3	10		44
	Trampling	1									1
	TOTAL	7	1		23		1	3	10		45
	PERCENT OF TOTAL	16	2		51		2	7	22		
Ducks	Feeding	1	1		1	1					4
	Trampling				1						1
	TOTAL	1	1		2	1					5
	PERCENT OF TOTAL	20	20		40	20					
GRAND TOTAL	Feeding	7	2		24	1	1	3	10		48
	Trampling	1			1						2
	TOTAL	8	2		25	1	1	3	10		50
	PERCENT OF TOTAL	16	4		50	2	2	6	20		

EXTENT OF REPORTED DAMAGE		LIGHT	MEDIUM	HEAVY	TOTAL
	Number	36	6	6	48
	Percent	75	12	12	

TABLE A-45

TYPE OF GAME BIRD DAMAGE
DISTRICT SIX

Bird Responsible	Manner Damaged	Crop Reported Damaged									
		Wheat	Barley	Oats	Grain	Swathed Grain	Potatoes	Beets	Garden	Hay	Total
Pheasant	Feeding	14	1	4	49	3	1	7	14	3	96
	Trampling	1	1	1	1						4
	TOTAL	15	2	5	50	3	1	7	14	3	100
	PERCENT OF TOTAL	15	2	5	50	3	1	7	14	3	
Grouse	Feeding	6			5						11
	Trampling	2			2						4
	TOTAL	8			7						15
	PERCENT OF TOTAL	53			47						
Ducks	Feeding	7	7	1	12	7			1		35
	TOTAL	7	7	1	12	7			1		35
	PERCENT OF TOTAL	20	20	3	34	20			3		
Geese	Feeding	2			3				1	1	7
	TOTAL	2			3				1	1	7
	PERCENT OF TOTAL	28			43				14	14	
Hungarian	Feeding								1		1
	TOTAL								1		1
GRAND TOTAL	Feeding	29	8	5	69	10	1	7	17	4	150
	Trampling	3	1	1	3						8
	TOTAL	32	9	6	72	10	1	7	17	4	158
	PERCENT OF TOTAL	20	6	4	46	6	1	4	11	3	

EXTENT OF REPORTED DAMAGE		LIGHT	MEDIUM	HEAVY	TOTAL
	Number	108	26	19	153
	Percent	70	17	12	

TABLE A-46

TYPE OF GAME BIRD DAMAGE
DISTRICT SEVEN

Bird Responsible	Manner Damaged	Crop Reported Damaged									
		Wheat	Barley	Oats	Swathed Grain	Grain	Potatoes	Beets	Garden	Hay	Total
Pheasant	Feeding	4		1	24			2	8		39
	Trampling									1	1
	TOTAL	4		1	24			2	8	1	40
	PERCENT OF TOTAL	10		2	60			5	20	2	
Grouse	Feeding	1			4				1		6
	TOTAL	1			4				1		6
	PERCENT OF TOTAL	17			67				17		
Ducks	Feeding	1			4	1					6
	TOTAL	1			4	1					6
	PERCENT OF TOTAL	17			67	17					
Geese	Feeding				1						1
	TOTAL				1						1
Turkey	Feeding				2						2
	TOTAL				2						2
GRAND TOTAL	Feeding	6		1	35	1		2	9		54
	Trampling									1	1
	TOTAL	6		1	35	1		2	9	1	55
	PERCENT OF TOTAL	11		2	64	2		4	16	2	

EXTENT OF		LIGHT	MEDIUM	HEAVY	TOTAL
REPORTED	Number	36	14	5	55
DAMAGE	Percent	65	25	9	

TABLE A-47

EXPANDED NUMBERS OF LIVESTOCK AND POULTRY LOST TO PREDATORS
RICHLAND COUNTY
MAIL SURVEY

Predator Responsible	Calves	Sheep	Lambs	Chickens	Turkeys	Ducks	Geese	Guineas
Skunk				1454		70		
Badger				377				
Mink				312		15		
Coyote	5	86	111					
Weasel				191				
Fox			25	136				
Dog		10	86				20	
Bobcat			20	50				10
Raccoon				60				
Owl				10				
Unknown							5	
TOTAL	5	96	242	2590		85	25	10

28 Units with losses to predators
204 =13.7%

Sample size $\frac{204 \times 100}{1004*}$

TABLE A-48

EXPANDED NUMBERS OF LIVESTOCK AND POULTRY LOST TO PREDATORS
RICHLAND COUNTY
PERSONAL INTERVIEW SURVEY

Predator Responsible	Calves	Sheep	Lambs	Chickens	Turkeys	Ducks	Geese	Guineas
Skunk				2220		29	15	
Raccoon				473	10		39	
Dog				185				
Weasel				122				
Mink				73		15		
Bobcat				24				
Owl				29				
Unknown				908		83	49	
TOTAL				4034	10	127	103	

61 Units with losses to predators
198 = 30.8

Sample size $\frac{198 \times 100}{1004*}$

*Number of farms calculated from personal interview survey.

TABLE A-49

EXPANDED NUMBERS OF LIVESTOCK AND POULTRY LOST TO PREDATORS
VALLEY COUNTY
MAIL SURVEY

Predator Responsible	Sheep	Lambs	Hogs	Chickens	Turkeys	Ducks	Geese
Skunk				1142			
Fox				464	36		
Bobcat	11			467			
Dog	40			153	73		
Badger				201			
Mink				182			15
Magpie				172			
Coyote	124						
Hawk				80			
Owl				36			
TOTAL	175			2897	109		15

36 Units with losses to predators
278 = 12.9%

Sample size $\frac{278 \times 100}{1014^*} = 27.4\%$

TABLE A-50

EXPANDED NUMBERS OF LIVESTOCK AND POULTRY LOST TO PREDATORS
VALLEY COUNTY
PERSONAL INTERVIEW SURVEY

Predator Responsible	Sheep	Lambs	Hogs	Chickens	Turkeys	Ducks	Geese
Skunk				1923	20		44
Bobcat			5	630	732		
Mink				78			
Badger				73			
Fox				49			
Dog	10			20			
Weasel				10			
Coyote		10					
Unknown			29	786		29	44
TOTAL	10	10	34	3569	752	29	88

49 Units with losses to predators
208 = 23.6%

Sample size $\frac{208 \times 100}{1014^*} = 20.5\%$

*Number of farms calculated from personal interview survey.

TABLE A-51

TYPE OF BIG GAME DAMAGE
RICHLAND COUNTY
MAIL SURVEY

Animal Responsible	Manner Damaged	Crop or Property Reported Damaged: Grain	Alfalfa	Hay	Haystack	Garden	Tree	Range	Corn	Fence	Beets	Total
Deer	Grazing	9	7	4		4			7		1	32
	Feeding		2		7							9
	Trampling	3										3
	Gr. & Tramp.	1							1			2
	TOTAL	13	9	4	7	4			8		1	46
	PERCENT OF TOTAL	28	20	9	15	9			17		2	87
Antelope	Grazing	1										1
	Feeding								1			1
	Trampling	3										3
	Gr. & Tramp.	1										1
	TOTAL	5							1			6
	PERCENT OF TOTAL	83							17			12
Deer and Antelope	*Gr. & Tramp.	1										1
GRAND TOTAL		19	9	4	7	4			9		1	53
PERCENT OF TOTAL		36	17	8	13	8			15		2	

EXTENT OF DAMAGE

	Light	Medium	Heavy	Total
Number	27	17	6	50
Percent	54	34	12	100

40 Farm Units Reporting Big Game Damage
198 = 20.2%

TABLE A-52

TYPE OF BIG GAME DAMAGE
RICHLAND COUNTY
PERSONAL INTERVIEW SURVEY

Animal Responsible	Manner Damaged	Crop or Property Reported Damaged										
		Grain	Alfalfa	Hay	Haystack	Garden	Trees	Range	Corn	Fence	Beets	Total
Deer	Grazing	3	5	3	3	1			2		3	20
	Feeding	3	3	3							1	10
	Trampling	2	1						2			5
	TOTAL	8	9	6	3	1			4		4	35
	PERCENT OF TOTAL	23	26	17	9	3			11		11	69
Antelope	Grazing	2							1			3
	Feeding	10	1									11
	Trampling									1		1
	TOTAL	12	1						1	1		15
	PERCENT OF TOTAL	80	7						7	7		29
Deer and Antelope	Feeding	1										1
	PERCENT OF TOTAL											2
GRAND TOTAL		21	10	6	3	1			5	1	4	51
PERCENT OF TOTAL		41	20	12	6	2			10	2	8	

EXTENT OF DAMAGE

	Light	Medium	Heavy	Total
Number	24	17	10	51
Percent	47	33	20	100

38 Farm Units Reporting Big Game Damage
204 = 18.6%

TABLE A-53

TYPE OF BIG GAME DAMAGE-VALLEY COUNTY MAIL SURVEY

Animal Responsible	Damaged	Crop or Property Reported Damaged										
		Grain	Alfalfa	Hay	Haystack	Garden	Tree	Range	Corn	Fence	Beets	Total
Deer	Grazing	12	7	3		2			2			26
	Feeding		1		8		1					10
	Trampling	8								1		9
	Gr. & Tramp.	3										3
	TOTAL	23	8	3	8	2	1		2	1		48
	PERCENT OF TOTAL	48	17	6	17	4	2		4	2		55
Antelope	Grazing	5	1			1		2	1			10
	Feeding		1									1
	Trampling	8										8
	Gr. & Tramp.	2	1									3
	TOTAL	15	3			1		2	1			22
	PERCENT OF TOTAL	68	14			5		9	5			25
Elk	Grazing								1			1
Deer and Antelope	Grazing	6	1			1						8
	Trampling	2										2
	Gr. & Tramp.	1										1
	TOTAL	9	1			1						11
	PERCENT OF TOTAL	82	9			9						13
Deer and Elk	Grazing	2										2
	Feeding				1							1
	Trampling	1										1
	Gr. & Tramp.	1										1
	TOTAL	4			1							5
	PERCENT OF TOTAL	80			20							6
GRAND TOTAL		51	12	3	9	4	1	2	4	1		87
PERCENT OF TOTAL		59	14	3	10	5	1	2	5	1		

EXTENT OF DAMAGE

	Light	Medium	Heavy	Total
Number	48	21	15	84
Percent	57	25	18	100

68 Farm Units Reporting Big Game Damage
278 = 24.5%

TABLE A-54

TYPE OF BIG GAME DAMAGE
VALLEY COUNTY
PERSONAL INTERVIEW SURVEY

Animal Responsible	Manner Damaged	Crop or Property Reported Damaged										
		Grain	Alfalfa	Hay	Haystack	Garden	Trees	Range	Corn	Fence	Beets	Total
Deer	Grazing	1	8	8		4	1		1			23
	Feeding	22	1		2							25
	Trampling			2								2
	TOTAL	23	9	10	2	4	1		1			50
	PERCENT OF TOTAL	46	18	20	4	8	2		2			67
Antelope	Grazing		2	2								4
	Trampling	11								1		12
	TOTAL	11	2	2						1		16
	PERCENT OF TOTAL	69	12	12						6		21
Deer and Antelope	Grazing			1								1
	Feeding	4	3									7
	Trampling	1										1
	TOTAL	5	3	1								9
	PERCENT OF TOTAL											12
GRAND TOTAL		39	14	13	2	4	1		1	1		75
PERCENT OF TOTAL		52	19	17	3	5	1		1	1		

EXTENT OF DAMAGE

	Light	Medium	Heavy	Total
Number	35	26	14	75
Percent	47	35	19	101

53 Farm Units Reporting Big Game Conflicts
208 = 25.5%

TABLE A-55

TYPE AND EXTENT OF GAME BIRD DAMAGE
RICHLAND COUNTY
MAIL SURVEY

Bird Responsible	Manner Damaged	Crop Reported Damaged									
		Wheat	Barley	Oats	Swathed Grain	Grain	Potatoes	Beets	Garden	Hay	Total
Pheasant	Feeding					25		6	2	1	34
	TOTAL					25		6	2	1	34
	PERCENT OF TOTAL					74		18	6	3	89
Ducks	Feeding					4					4
	TOTAL					4					4
	PERCENT OF TOTAL										11
GRAND TOTAL	Feeding					29		6	2	1	38
	TOTAL					29		6	2	1	38
	PERCENT OF TOTAL					76		16	5	3	

EXTENT OF REPORTED DAMAGE		LIGHT	MEDIUM	HEAVY	TOTAL
	Number	31	1	6	38
	Percent	82	3	16	

36 Units Reported Game Bird Damage
198 = 18.2%

TABLE A-56

TYPE AND EXTENT OF GAME BIRD DAMAGE
PERSONAL INTERVIEW SURVEY
RICHLAND COUNTY

Bird Responsible	Manner Damaged	Crop Reported Damaged: Wheat	Grain	Oats	Corn	Swathed Grain	Potatoes	Beets	Garden	Hay	Total
Pheasant	Feeding	1	4		21			5	4		35
	Trampling				1						1
	TOTAL	1	4		22			5	4		36
	PERCENT OF TOTAL										92
Ducks	Feeding				3						3
	PERCENT OF TOTAL										8
GRAND TOTAL		1	4		25			5	4		39
PERCENT OF TOTAL		3	10		64			13	10		

EXTENT OF REPORTED DAMAGE		LIGHT	MEDIUM	HEAVY	TOTAL
	Number	22	13	4	39
	Percent	56	33	10	

32 Units Reported Game Bird Damage
204 = 15.7%

TABLE A-57

TYPE AND EXTENT OF GAME BIRD DAMAGE
VALLEY COUNTY
MAIL SURVEY

Bird Responsible	Manner Damaged	Crop Reported Damaged							
		Wheat	Barley	Oats	Grain	Swathed Grain	Garden	Hay	Total
Pheasant	Feeding	5			4		2	1	12
	TOTAL	5			4		2	1	12
	PERCENT OF TOTAL	42			33		17	8	60
Grouse	Feeding	1							1
	Trampling				2				2
	TOTAL	1			2				3
	PERCENT OF TOTAL	33			67				15
Ducks	Feeding	2		1	1	1			5
	TOTAL	2		1	1	1			5
	PERCENT OF TOTAL	40		20	20	20			25
GRAND TOTAL	Feeding	8		1	5	1	2	1	18
	Trampling				2				2
	TOTAL	8		1	7	1	2	1	20
	PERCENT OF TOTAL	40		5	35	5	10	5	100

EXTENT OF REPORTED DAMAGE		LIGHT	MEDIUM	HEAVY	TOTAL
	Number	15	5		20
	Percent	75	25		

17 Units Reported Game Bird Damage
278 = 6.1%

TABLE A-58

TYPE AND EXTENT OF GAME BIRD DAMAGE
PERSONAL INTERVIEW SURVEY
VALLEY COUNTY

Bird Responsible	Manner Damaged	Crop Reported Damaged							Percent of Total
		Wheat	Grain	Oats	Corn	Garden	Hay	Total	
Pheasant	Feeding	3	3		3	6		15	62
Grouse	Feeding	1		1				2	8
Ducks	Feeding		1		1		1	3	12
Hungarian	Feeding					4		4	17
GRAND TOTAL		4	4	1	4	10	1	24	
PERCENT OF TOTAL		17	17	4	17	42	4		

EXTENT OF REPORTED DAMAGE		LIGHT	MEDIUM	HEAVY	TOTAL
	Number	13	6	5	24
	Percent	54	25	21	100

20 Units Reported Game Bird Damage
208 = 9.6%

TABLE A-59

TYPE AND EXTENT OF FUR ANIMAL DAMAGE AS REPORTED
IN MAIL AND PERSONAL INTERVIEW SURVEYS
RICHLAND COUNTY

	Fur Animal Causing Damage		Crop or Property Reported Damaged: Tree Cutting	Irrigation	Reservoir	Land Flooding	Field Flooding	Stream-bank	Crop Damage	Total
MAIL SURVEY	Beaver	Total	12	4	2	3			1	22
		Percent of total	54	18	9	14			4	92
	Muskrat	Total			2					2
		Percent of total								8
	GRAND TOTAL	Total	12	4	4	3			1	24
		Percent of total	50	17	17	12			4	100

EXTENT OF DAMAGE	LIGHT	MEDIUM	HEAVY	TOTAL
Number	10	6	4	20
Percent	50	30	29	20

22 Farm Units With Fur Animal Damage
198 = 11.1%

PERSONAL INTERVIEW SURVEY	Beaver	Total	16	13	1	2	4	1		37
		Percent of total	43	35	3	5	11	3		90
	Muskrat	Total		2	1					3
		Percent of total								7
	Badger	Total		1						1
		Percent of total								2
	GRAND TOTAL	Total	16	16	2	2	4	1		41
		Percent of total	39	39	5	5	10	2		99

EXTENT OF DAMAGE	LIGHT	MEDIUM	HEAVY	TOTAL
Number	29	8	4	41
Percent	71	20	10	

40 Farm Units With Fur Animal Damage
204 = 19.6%

TABLE A-60

TYPE AND EXTENT OF FUR ANIMAL DAMAGE AS REPORTED
IN MAIL AND PERSONAL INTERVIEW SURVEYS
VALLEY COUNTY

	Fur Animal Causing Damage		Crop or Property Reported Damaged: Tree Cutting	Irrigation	Reservoir	Land Flooding	Field Flooding	Stream-bank	Damage	Total
MAIL SURVEY	Beaver	Total	31	3		2	1			37
		Percent of total	84	8		5	3			97
	Muskrat	Total		1						1
		Percent of total								3
	GRAND TOTAL	Total	31	4		2	1			38
		Percent of total	82	10		5	3			

EXTENT OF DAMAGE	LIGHT	MEDIUM	HEAVY	TOTAL
Number	12	11	10	33
Percent	36	33	30	

39 Farm Units Reporting Fur Animal Damage
278 = 14.0%

PERSONAL INTERVIEW SURVEY	Beaver	Total	28	11	2	2	2			45
		Percent of total	62	24	4	4	4			90
	Muskrat	Total		1	2					3
		Percent of total								6
	Raccoon	Total		1						1
		Percent of total								2
	Badger	Total						1		1
		Percent of total								2
	GRAND TOTAL	Total	28	13	4	2	2	1		50
		Percent of total	56	26	8	4	4	2		

EXTENT OF DAMAGE	LIGHT	MEDIUM	HEAVY	TOTAL
Number	20	21	9	50
Percent	40	42	18	

46 Farm Units With Fur Animal Damage
208 = 22.1%

TABLE A-61

NUMBER OF FARMS AND ACREAGE CLOSED TO HUNTING
IN RELATION TO AGRICULTURAL TYPES

Agricultural Type	Ranch and Farm Units			Acreage in Units		
	Units in Survey	Units Closed to Hunting	Percentage Closed to Hunting	Acreage in Survey	Acreage Closed to Hunting	Percentage Closed to Hunting
Irrig. Cash Crop	732	63	8.6	722,260	18,501	2.6
Dry Land Grain	1777	162	9.1	2,404,179	179,954	7.4
Range Livestock	3127	380	12.2	13,406,604	1,385,534	10.3
General Farming	1069	153	14.3	1,127,743	104,414	9.3
TOTAL	6705	758	11.3	17,660,786	1,688,403	9.6
Unknown	780	5		1,614,658	4,101	
TOTAL	7485	763	10.2	19,275,444	1,692,504	8.8

TABLE A-62

SUMMARY OF LAND STATUS REPORTED
CONCERNING PUBLIC HUNTING

Land Status	Farm Units	Total Acreage	Average Acreage
Hunting Allowed	5,614	16,277,328	2,899
Hunting Not Allowed	763	1,692,504	2,218
	6,377	17,969,832	2,818
Land in Refuge	26	71,067	2,733
Unknown Hunting Status	673	1,198,909	1,781
No Acreage Entry	404		

$\frac{763}{6377}$ = 11.96% Farm Units Closed to Hunting

$\frac{1,692,504}{17,969,832}$ = 9.42% Acreage closed to hunting

TABLE A-63

STATUS OF AGRICULTURAL UNITS AND ACREAGE
IN RELATION TO POSTING AGAINST HUNTING
PERSONAL INTERVIEW SURVEY

	LAND POSTED				LAND NOT POSTED		TOTAL	
	Units Without Permission	Units With Permission	Total Units	Total Acreage	Units	Acreage	Units	Acreage
Richland County								
EXTENT OF POSTING								
All of Land	21	31	52	74,200				
Around Buildings Only	6	1	7	26,562				
Around Livestock Only	5	1	6	12,520				
TOTAL	32	33	65	113,282	139	171,791	204	285,073
PERCENT OF TOTAL	16%	16%	32%	40%	68%	60%		
Valley County								
EXTENT OF POSTING								
All of Land	5	20	25	85,358				
Around Buildings Only	2		2	5,124				
Around Livestock Only	9		9	18,950				
TOTAL	16	20	36	109,432	172	569,545	208	678,977
PERCENT OF TOTAL	8%	10%	17%	16%	83%	84%		

MAIL SURVEY QUESTIONNAIRE

Figure A-1

STATE OF MONTANA

DEPARTMENT OF FISH AND GAME

Helena, Montana
March 24, 1958

IN COOPERATION WITH
THE STATE DEPARTMENT OF AGRICULTURE

Dear Sir:

The State Department of Fish and Game and the Department of Agriculture are interested in doing a better job of assisting ranchers and farmers with their wildlife damage problems. In order to do this we need your answers to the following questions. They will be treated as confidential and will be combined with those of others surveyed for presentation on a county or statewide basis. Your information is important even if you had no wildlife damage during 1957.

Your cooperation will be sincerely appreciated. Please reply soon.

Very truly yours,

P. J. Creer
P. J. CREER, STATISTICIAN
Department of Agriculture

A. A. O'Claire
A. A. O'CLAIRE, DIRECTOR
Department of Fish and Game

---

1. Total acres in ranch or farm you operate (owned and rented) _____

2. What was your PRINCIPAL farming or ranching operation during 1957? (mark X)

   Irrigated cash crop (___) Dryland grain (___) Dairy, poultry, swine (___) Range livestock (___)

   Feeder livestock (___) Fruit (___) General (___)

3. Please list below the NUMBERS of livestock and poultry that you had on hand as of January 1, 1958

   Cattle and calves _____ Sheep _____ Hogs _____ Chickens _____

   Turkeys _____ Ducks _____ Geese _____ Other _____
   Kind and No.

4. Were any of your crops or stored feed damaged by deer, elk or antelope during 1957? Yes (_____)

   No (_____) If so, please list the details.

Animal causing damage	Crop damaged - Kind of damage	Extent of damage (mark X) light	medium	heavy
_____	_____	( )	( )	( )
_____	_____	( )	( )	( )
_____	_____	( )	( )	( )

PLEASE CONTINUE ON OTHER SIDE

Were any of your crops damaged by pheasants, grouse, ducks or geese during 1957? Yes (___) No (___) If so, please list the details.

Birds causing damage	Crop damaged - Kind of damage	Extent of damage (mark X)		
		light	medium	heavy
_____	_____	( )	( )	( )
_____	_____	( )	( )	( )
_____	_____	( )	( )	( )

6. Was your property damaged by beaver or muskrat during 1957? Yes (___) No (___) If so please list the details.

Animals causing damage	Kind of damage	Extent of damage (markX)		
		light	medium	heavy
_____	_____	( )	( )	( )
_____	_____	( )	( )	( )
_____	_____	( )	( )	( )

7. Did you lose any livestock or poultry during 1957 to: wild animals, wild birds, stray cats, or wild dogs? Yes (___) No (___) If so, please list the details.

Animal causing damage	What was killed	Number Killed
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

8. If damage occurred what measures were taken to control the wildlife damage to your property during 1957 ? (mark X)

None (___) Shooting (___) Trapping (___) Poison (___) Fencing (___) Repellents (___) Game Department called (___) Government trapper called (___)

9. Did wildlife damage to your property during 1957 continue after taking the control measures marked above? Yes (___) No (___) If so, what class of animal was responsible?

Deer, elk or antelope (___) Game Birds (___)
Beaver or muskrat (___) Predatory animals or birds (___)

10. Was hunting by the public allowed on your place during 1957? Yes (___) No (___)

11. Was trapping allowed on your place during 1957? Yes (___) No (___)

12. Remarks _____

_____

_____

Name _____

Address _____

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